SEPTEMBER 28, 1944

American Machinist

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Flush Pin Gages Meet Stiff Ordnance Requirements

•

Heavy Slotting Tools Devised for Turret Lathes

•

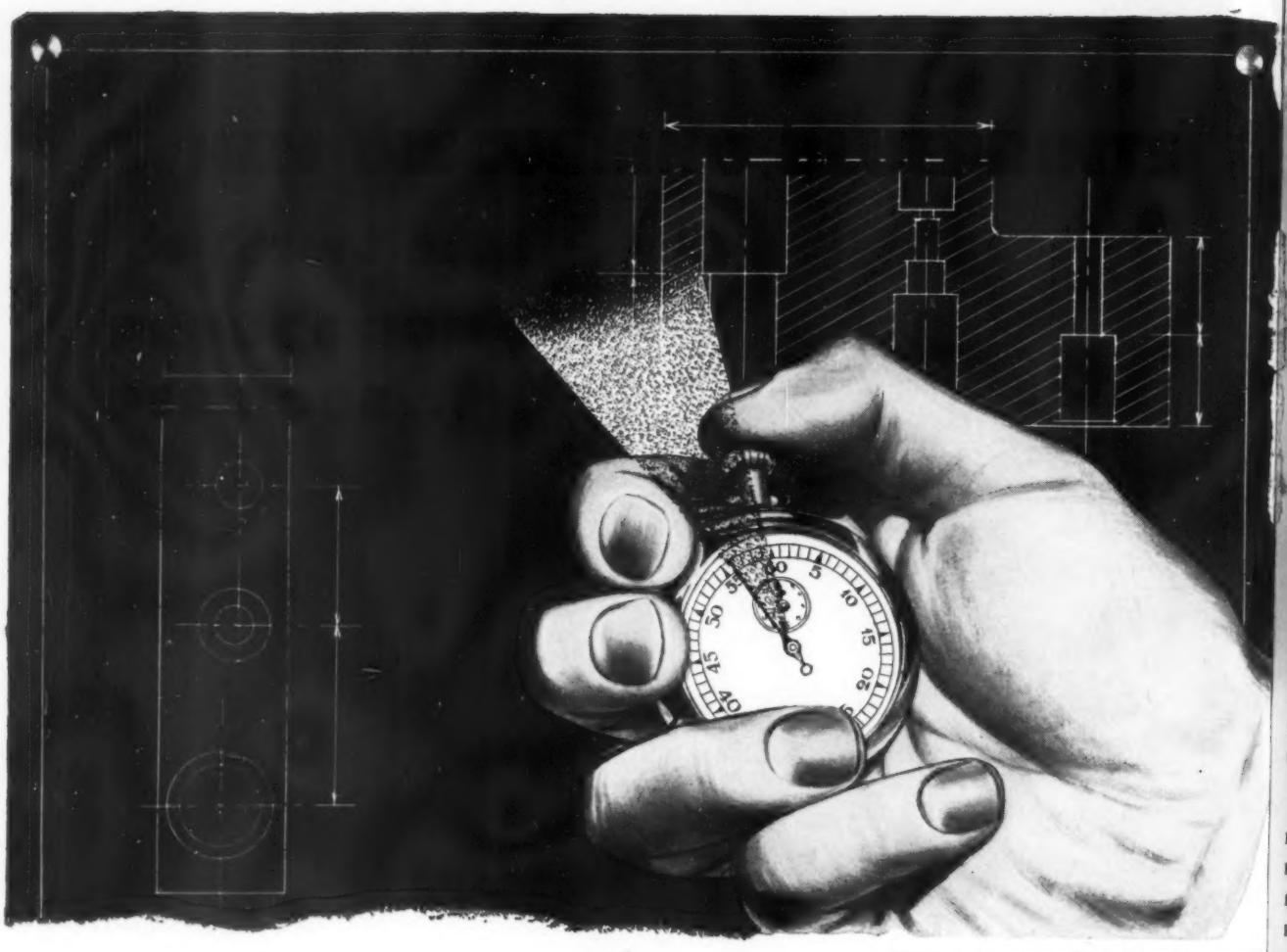
New Methods Overcome Grinding Problems

•

Synthetic Rubber Has Long Life in Blast-Cleaning Service

Reconversion Section

FROM RIFLES BACK TO TYPEWRITERS
DIGEST OF CONTRACT SETTLEMENT ACT
HARVEY MACHINE PLANS FOR TERMINATION



. . . IT'S TIME FOR *Precisioneering!*

CAREFUL PLANNING FOR PRODUCTION will make the difference between profit and loss for many a post-war product.

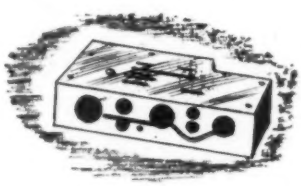
Planning to produce more units per machine per hour . . . to hold closer tolerances and minimize rejects . . . to eliminate unnecessary machining operations.

And that is where *Precisioneering* can help. From a background of 40 years experience, Heald Engineers are ready to interpret your problem in terms of today's war-won "know how"—select the right Heald machine—custom build the tooling and fixtures—that mean the ultimate in speed, economy and precision.

We invite you to sit down with the *Precisioneers* at Heald Headquarters in Worcester . . . or call in one of our local field engineers. They will offer for your consideration *proved* ideas and production methods—worked out in terms of precision boring, turning, facing or grinding *your product.*

THE HEALD MACHINE CO.
WORCESTER 6, MASS.

Another Example of
PRECISIONEERING RESULTS



Eight holes ranging from 1.125" to .270" are precision bored and faced in both sides of this cast iron valve body *with a single boring head* on a Heald No. 48A Borematic. In spite of the diversity of surfaces borized, tool and fixture equipment is simple, interchangeable—permitting setups in minimum time. Individual holes as well as spacing and alignment are held to a high degree of accuracy.

HEALD *for precision plus . . . economy plus*

Internal and Surface Grinding Machines • Bore-Matic Precision Finishing Machines

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RETURN POSTAGE GUARANTEED

VOLUME 88 NUMBER 20

AMERICAN MACHINIST, Copyright 1944 by McGraw-Hill Publishing Co., Inc. Published every other Thursday, price 35c a copy. Allow ten days for change of address. Subscription rates—United States, Mexico and Central and South American countries, $5 a year, $8 for two years, $10 for three years. Canada, $6 a year, $10 for two years, $12 for three years. All other countries, $10 a year, $16 for two years, $20 for three years. Entered as second class matter, August 13, 1943, at Post Office, New York, N. Y., under the act of March 3, 1879. Printed in U.S.A. Cable address, "McGraw-Hill, New York." Member of A.B.P. Member of A.B.C.

A McGRAW-HILL PUBLICATION

PRINTED IN U. S. A.

MAJOR ARTICLES

Flush Pin Gages Meet Stiff Ordnance Needs..*Capt. W. L. Kimball* 91
Drilling Structural Angles Simplified.....*C. W. Hinman* 95
Shop Shots..... 96
Heavy Slotting Tools Devised for Turret Lathes.....*E. Sperisen* 98
Special Tools Used to Cut Turbine Wheel Buckets...*Carl G. Preis* 102
Taking Tools to Heavy Work by a Jib Crane.....*J. I. Karash* 105
Incombustible Compressor Lubricant..*R. W. Andrews & E. M. Kipp* 107
Grinding Problems Overcome by New Shop Practices..*J. S. Steiner* 108
Air-Operated Jig for Bearing Shells.....*I. F. Huey* 110
Synthetic Rubber Has Long Life in Blast-Cleaning..*H. E. Linsley* 112

RECONVERSION SECTION

From Rifles Back to Typewriters..... 121
Contract Settlement Act Initial Step in Termination Program..... 124
Successful Planning for Contract Termination.....*L. A. Harvey* 126

SHORT ARTICLES

Lapping Coolant.....*Ralph Woodward* 114
Gage Acceptance Clinic..... 106
Dumping Substandard Machines Shortsighed.....*Henri Benedictus* 114

PRACTICAL IDEAS

Adapting a Shaper to Cutting Off Tubing.....*Robert Mawson* 115
Adapter Reclaims Discarded Grinding Wheels.....*Jack T. Akers* 116
Novel Die for Securing Motor Laminations.....*Arthur K. Baker* 116
Checking Angles to Minutes on a Protractor.....*C. O. Holmquist* 117
Multiple Stock Dial Shows Progress of Lathe Cuts.....*H. E. Wiser* 117
Shear Pin Eliminates Spindle Fork Breakage.....*W. E. Bieber* 118
An Oilcan That Works Uphill.....*Fay E. Clarke* 118
Ramps and Dollies Ease Labor in Changing Car Wheels.*L. W. Sagle* 118
Scriber on Planer Gage Used for Layouts.....*C. M. Huntley* 119
Stop Adapter for Use in Lathe Collets.....*J. F. Zielinski* 119
Boring Tools Mounted in Removable Bars.....*Joseph Gralewcz* 120
Automatic Feed of Parts Reduces Grinding Time...*Anthony Urban* 120

NEWS OF THE INDUSTRY

Gaging Business 132a
Inside Detroit 132c
Wartime Washington 132e
Spotting the Air News..... 132f
Names in the News..... 132g
Obituaries..... 132h

DEPARTMENTS

Editorial 89
Reference Book Sheets..... 129
Shop Equipment News..... 133
Parts and Materials..... 148
Trade Publications 150
Seen and Heard..... 152

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★ From_____

★ _____

★ To_____

★ _____

★ Signed_____

American Machinist Chips

What's Ahead . . . In the October 12 issue of *American Machinist* will be featured the sixth "Metal-Working Tomorrow" special section, "What's Ahead in Welding." Judging from the enthusiasm expressed by readers for this series of future-looking articles and by the general interest in new welding practices, we believe you'll want to be sure and read this feature.

Come See Us . . . Once again the time for the annual Metal Show rolls around. As you probably know, the place is Cleveland, the date October 16th to the 20th.

If you're planning to be there, please consider this a sincere invitation to drop in at *American Machinist's* booth —No. B-111. We're not having any bathing girls or other fancy attractions, but we'll have on display quite a bit of helpful literature in which you may be interested.

Members of the editorial staff will be on hand, as usual, and we'd like to renew old acquaintances and make some new ones.

Men Wanted . . . Today we saw something new—at least to us—in the way of advertising for employees. Strolling nonchalantly beneath the lights of Times Square in New York was a man carrying one of these fore-and-aft "sandwich" advertising signs. The message was a little different than those usually featured through this medium . . . it was a call from Bethlehem Steel Company for new workers.

Coincidence . . . On this page in our August 31 issue, we carried a little reminiscent yarn about an old-time Potash & Perlmutter show at which *American Machinist* was host to a number of machine tool men. On that very date, Aug. 31, Ludwig Satz, Jewish Comedian, whom Alexander Woollcott once called "The Charlie Chaplin of the Yiddish Stage," died in New York. One of the more popular rolls the actor enjoyed was that of Abe Potash in the famous show.

Swan Song . . . With night shifts becoming unnecessary in some plants these days, workers are viewing their return to the daytime trick with mixed emotions.

The following bit of melancholia appeared in a recent issue of *"Bomb Rack,"* house organ for National Machine Products, Los Angeles, upon the discontinuance of its night shifts. We think you might enjoy it.

Bye, Bye, Night Shift

By Joe Ott

Rustling softly through the black stillness of the plant the ghostly spirit of the Night Shift wends its lonely way. Its existence is now but a pleasant vivid memory; a radical section of the lives of previously self-admitted normal humans.

We were a closely knit group, united as to purpose, divided as individuals with all the minor petty differences of a large family. We loved and hated furiously, if insensibly, but from where this extra emotional energy was derived we'll never know.

The sacrifices and rewards of nocturnal toil vie for the honors. Romances and friendships, though firmly established, faded and dissolved in the absence of contact. Homes were shaken from their foundations by conflicting hours and habits and by the irritability of confused and tired minds. Usual methods of relaxation had to be supplanted. Some could not. The bars did a colossal Sunday night business. Children (some say this is an advantage) forgot what parents looked like. Some adopted new ones. The health of an unfortunate few individuals broke with the strain of abnormality.

Most of us adapted ourselves to our strange and different world and were content with a weak pride of doing the more difficult task. Happiness, after all, is but the adjusting of one's self to present circumstances and many of us salvaged our share.

The confusion of the day shift (one last dig) was refreshingly missing and the absence of officialdom gave one a sense of responsibility.

There seemed to be more time to do things—to argue with the ration board for more gas—visit bargain sales—wash the car—acquire that tan—cut the grass—tuck more bonds in the bank—look for a decent apartment or a tender roast—play golf with the liquor store and gas station owners—go to school—and best of all—to make warm friends with the sun each afternoon after bitterly cursing him for peeking through the curtain crack in the early morning.

After hours there were beer-busts and benders, billiards and bowling, poker parties and long serious discussions over three A. M. snacks. The share-the-ride plan provided many romantic interludes where no one worried about whiskers, make-up, attire, or Odorono.

So, here's to you, oh restless spirit of the night shift. Go rest your wan, worn, weary soul. You have played your part well. You were high in production and higher in efficiency. Your memory will be preserved not only by the tools of vengeance you produced but by the roaring, rollicking, romantic exit that you achieved.

From the Mailbag . . . Here is another comment from a reader on the value of the advertising pages in *American Machinist:*

"I find the advertisements in American Machinist *of almost as much interest as the editorial matter. This is particularly true of machine tool and processing equipment advertising. A sizeable portion of my* American Machinist *reading time seems to be spent on the advertisements." Gustav Maass, Asst. to the Fac. Mgr., Republic Aviation Corp., Evansville, Ind.*

BEVEL GEAR DRIVES — TO *Victory*

Photos Courtesy Packard

Ground Zerol Bevel Gear Planetary Reductions . . . for Marine Drives

FULL SPEED AHEAD

The Army Air Forces speedy rescue boats rely on ground Zerol planetary reductions to translate the power of their mighty engines into full speed ahead. Cut and ground on Gleason machines, Zerol bevel gears provide a smooth, dependable flow of power from engine to propeller, even under the terrific speeds and loads encountered in the fast, life-saving maneuvers of these craft in the roughest seas.

The Zerol planetary arrangement offers the advantages of a straight-line unit and can be used for reductions from approximately 1.5/1 to 2.5/1. Because the load is distributed simultaneously over several tooth contacts, it permits a lighter, more compact unit than can be obtained with ordinary single reduction gearing.

The localized tooth bearing characteristic of Zerol bevel gears aids in their assembly and compensates for minor deflections of the gears in operation. Grinding of the hardened, curved-teeth of these gears assures extreme accuracy and the complete uniformity of all teeth for maximum strength and durability.

Investigate the advantages of Zerol planetary reductions for your gear drives by sending in prints to the Gleason Works. We will be glad to make recommendations and prescribe machines for manufacturing the gears.

GLEASON

GLEASON WORKS

Builders of Bevel Gear Machinery for Over Seventy-five Years

1000 UNIVERSITY AVENUE, ROCHESTER 3, N. Y., U. S. A.

CAM

CINCINNATI

Profile milling side walls of aircraft engine master rod cap on a CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine with Cam Roller Attachment. The cutter mills a profile like this:

Keep on buying WAR BONDS

THE CINCINNATI

MILLING MACHINES

CONTROLLED RISE AND FALL MILLER

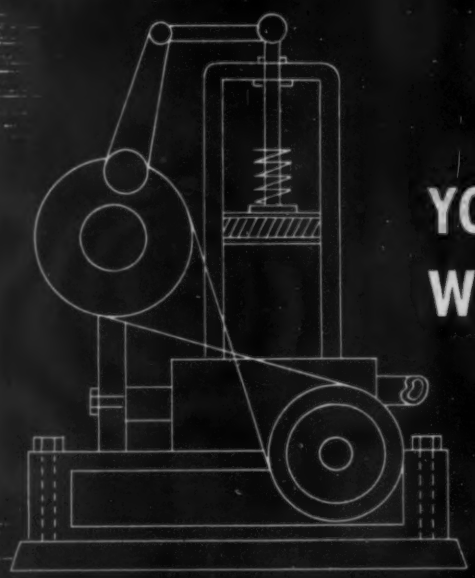
Accurately Duplicates Profile of Cam

The setup illustrated on the opposite page automatically handles a contour milling operation accurately, quickly and economically. The reason is simple and logical. This machine, a CINCINNATI No. 2-24 Automatic Rise and Fall Miller, is equipped with a *Cam Roller Attachment for contour milling* . . . a standard "on demand" feature which may readily be built into the machine. The only special equipment, designed by CINCINNATI Application Engineers, is the single station hand-clamping fixture which holds the part during the milling operation. After loading, the operator flips the starting lever and the machine goes through the entire operating cycle automatically. ¶ There will be plenty of use for this type of equipment in the manufacture of civilian products. Talk it over with the engineers here at Milling Headquarters.

CINCINNATI *No. 2-24 Automatic Rise and Fall Miller. Catalog M-909-1 contains complete details. Sweet's Catalog File gives a brief description of this and other* CINCINNATI *Milling Machines.*

MILLING MACHINE CO. CINCINNATI 9, OHIO, U. S. A.

BROACHING MACHINES • CUTTER SHARPENING MACHINES



YOU DREAM IT... WE'LL HELP BUILD IT!

YOU see, that's our business . . . building things . . . all sorts of things.

Jones & Lamson is the oldest machine tool company in America and there is literally no industry (and few important products) to which Jones & Lamson engineering has not contributed, both in war and in peacetime production.

So you dream it . . . we'll help build it.

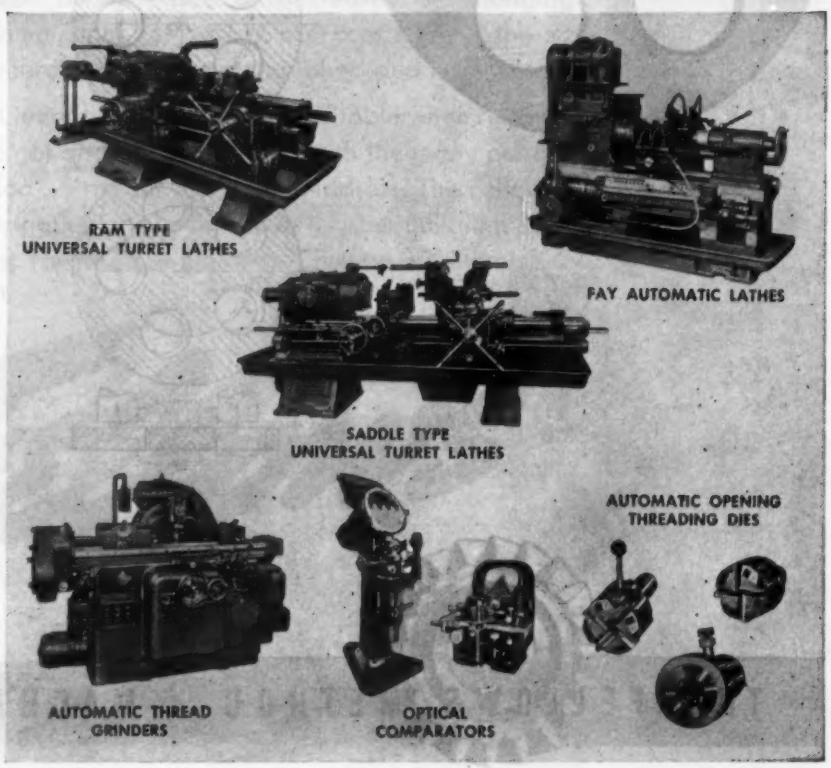
We'll draw up complete production specifications. We'll engineer the tooling. We'll specify, design, and create any special machine tools needed. We'll even plan the plant and its equipment.

You dream it.

We'll help build it . . . from the ground up, if need be.

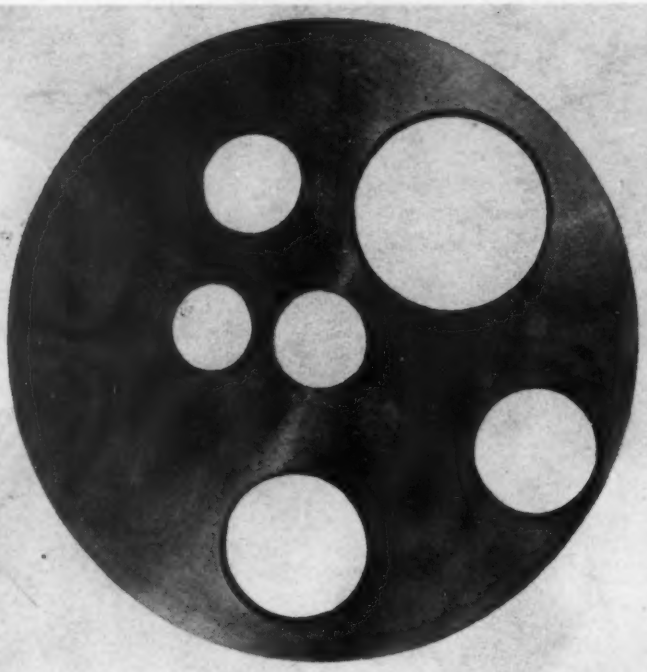
JONES & LAMSON
MACHINE COMPANY
SPRINGFIELD, VERMONT, U. S. A.

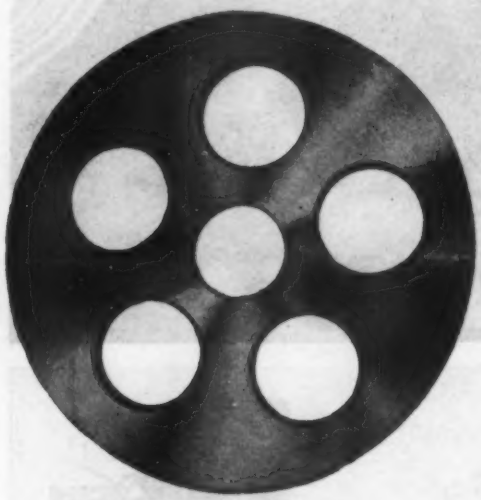
Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers.

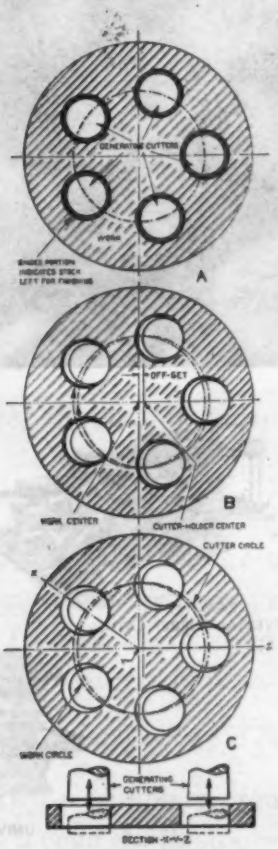


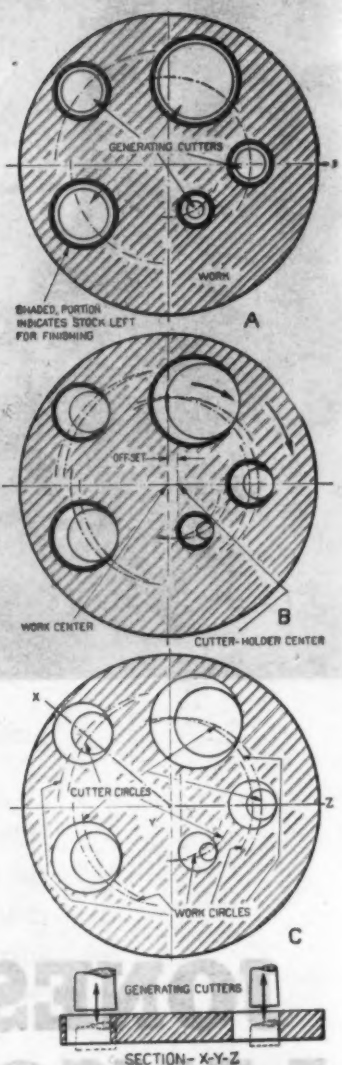
ACCURATE

The round holes in these two parts which had to be a push fit for balls, were produced by the "off-set" generating method, which has many other applications. The holes could be generated to any size, spacing or positioning.





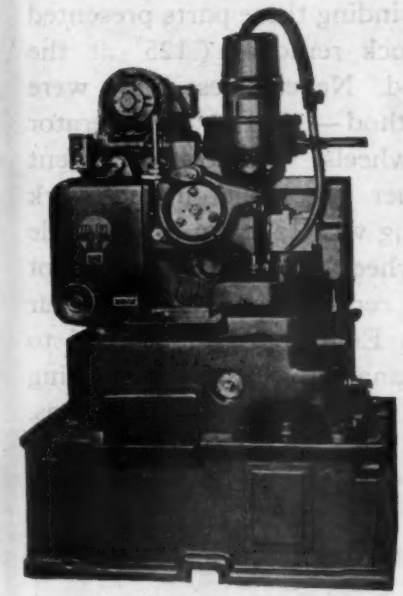




All holes in each part cut IN ONE OPERATION

THE FELLOWS METHOD . . . MACHINES AND TOOLS FOR

ROUND HOLES...BY THE SAME MACHINE THAT CUTS GEARS



The generating of round holes, would at first glance, seem to be far removed from the cutting of gears, but as a matter of fact, can be accomplished with the same ease and accuracy on the Gear Shaper.

For instance: the round holes in the two pieces shown here were generated on a standard Gear Shaper, by the "off-set" generating method and using special holders and cutters. These particular holes happen to be round, but other shapes, such as square, hexagon, etc., can also be generated by using cutters of the required shape.

One advantage gained by generating holes by the "off-set" generating method is that the size of the hole can be increased or decreased by changing the amount of "off-set". Close control over the size is, therefore, easily accomplished and maintained.

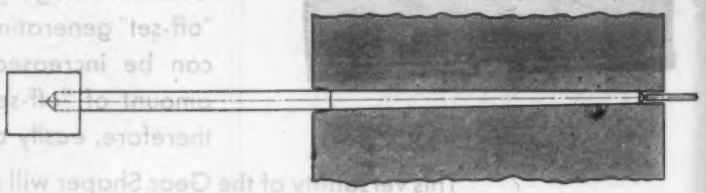
This versatility of the Gear Shaper will prove profitable when reconversion is possible. If you are not already acquainted with the many advantages of "The Fellows Method", write for literature. Address: The Fellows Gear Shaper Company, Springfield, Vermont—or 616 Fisher Building, Detroit 2, Michigan or 640 West Town Office Building, Chicago 12, Illinois.

Fellows

FOR ALL OPERATIONS FROM BLANK TO FINISHED GEAR

Tapering Textile Spindles
ON A CINCINNATI CENTERLESS

Here's another type of work which may be handled to advantage on a CINCINNATI No. 2 Centerless . . . grinding the taper on both ends of textile spindles; *from the straight bar*. Grinding these parts presented a difficult problem because of high stock removal (.125" at the small end) and the wide wheels required. Nevertheless, they were handled successfully by the end-feed method — that is, the operator manually pushes the work between the wheels. ¶ Extra equipment for the setup illustrated includes: pusher type roller infeed work rest; profile hydraulic truing over grinding wheel; screw type profile truing over regulating wheel, and 8" wheel mounts. ¶ Why not investigate the newer applications of the centerless method for your postwar work? CINCINNATI Application Engineers will be glad to give you the benefit of their experience in analyzing customer grinding problems and recommending practical and economical solutions.



Simplified sketch of the end-feed method of centerless grinding, applied to the pointing operation on textile spindles.

Left: CINCINNATI *No. 2 Centerless Grinding Machine. Catalo G-456-1 contains complete specifications. For a brief descriptio look in Sweet's Catalog File for Mechanical Industries.*

Keep on buying WAR BONDS

CINCINNATGR

CINCIN

CENTER TYPE GRINDING MACHIN ENTER

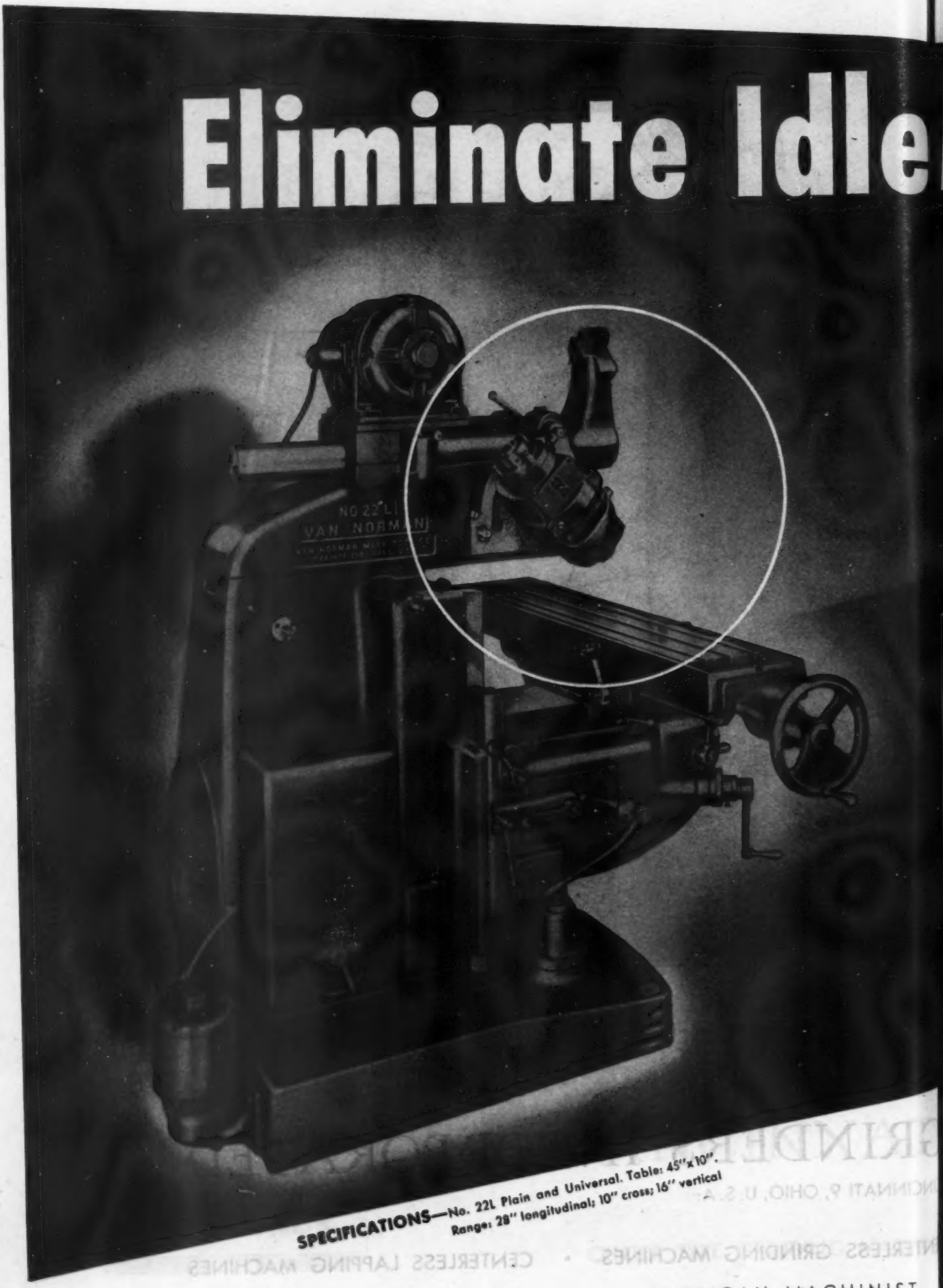
CINCINNATI

GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U. S. A.

CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES

Eliminate Idle M



SPECIFICATIONS—No. 22L Plain and Universal. Table: 45" x 10". Range: 28" longitudinal; 10" cross; 16" vertical

eMachine Time

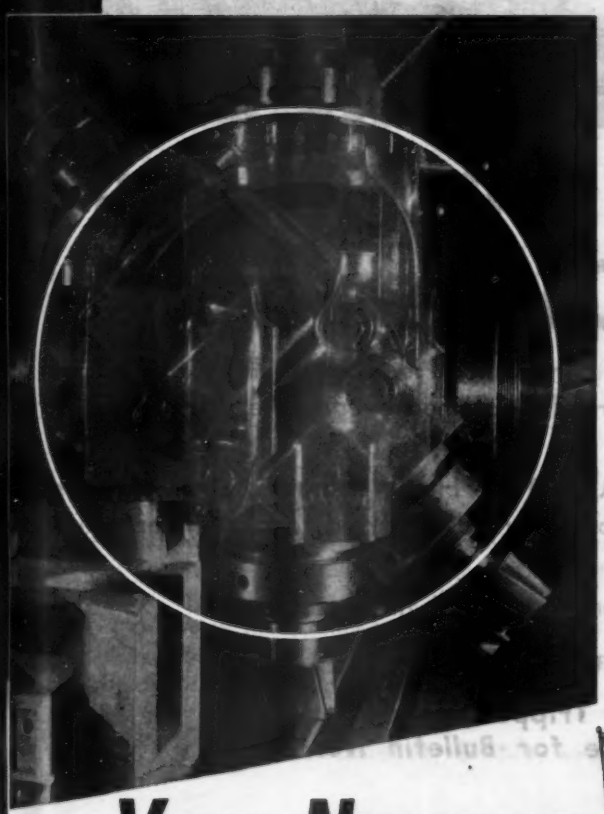
CAUSED BY WORK RESET-UPS

★ ★ ★ ★ ★

WITH VAN NORMAN RAM-TYPE UNIVERSAL MILLERS

Repeated set-ups of a work-piece through successive milling operations result in production loss because the machine is idle and non-productive while the operator makes the reset-up. Added up, this idle time often exceeds the machines productive time.

You can minimize idle machine time and increase production with a Van Norman Ram-type Universal Miller . . . the milling machine that gives you horizontal, angular, or vertical milling without changing the set-up or moving the work to another machine. Not only does this enable you to complete most jobs with the original set-up, but it also eliminates errors and subsequent work spoilage that very often results with continuous reset-ups.



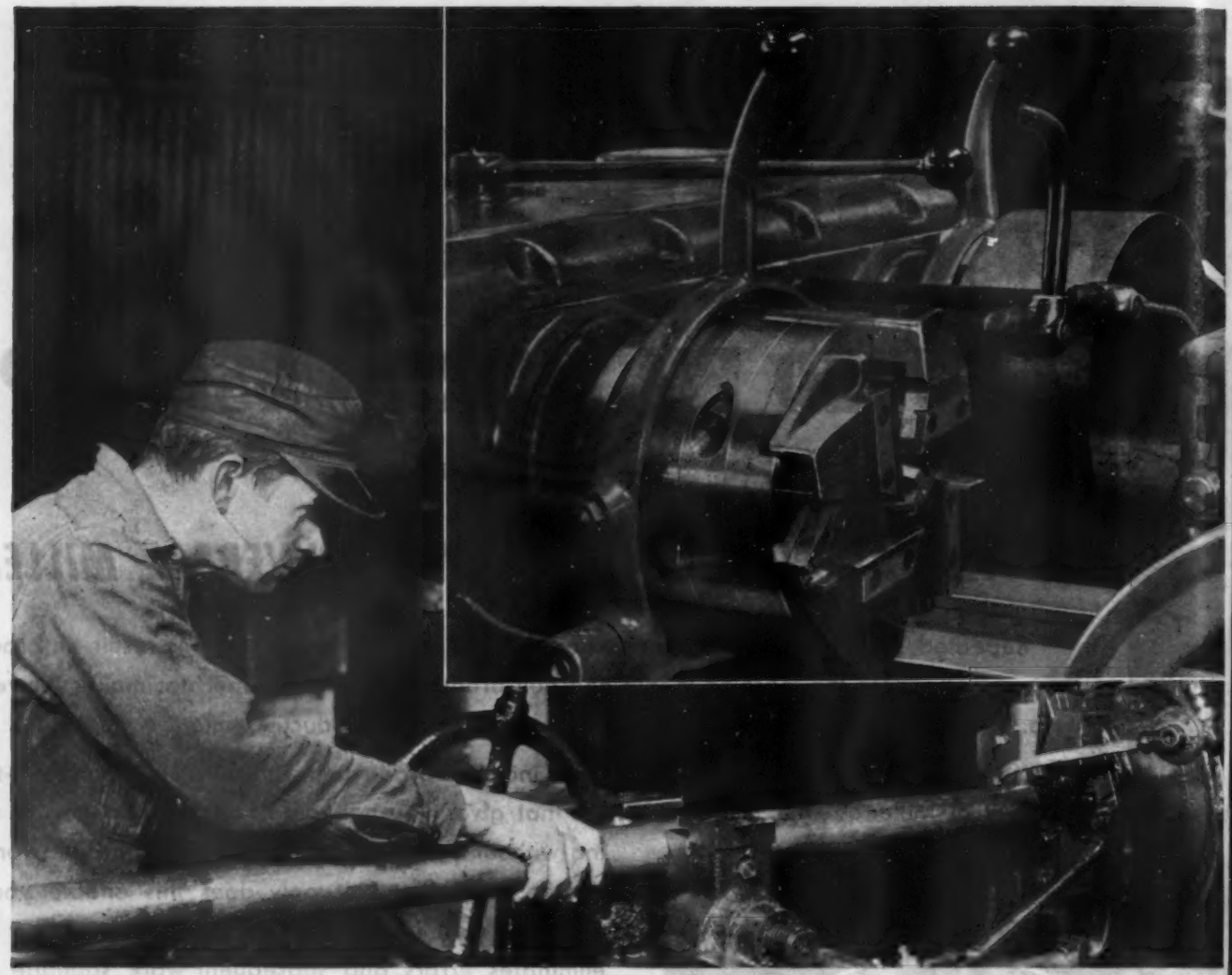
Adjustable Cutterhead Mills at any Angle

The Van Norman Swiveling cutterhead, mounted on a sliding ram, is quickly and easily moved to any desired cutting position between horizontal and vertical. Three heavy clamping bolts hold the cutterhead rigidly in position for precision milling. Hardened stops, accurately set at the factory, are provided for 0° and 90° positions of the head. Angular positions are indicated on an easily readable dial, graduated in degrees.

ARMY E NAVY

Van Norman Milling Machines

VAN NORMAN COMPANY, SPRINGFIELD 7, MASS.



WHERE PRODUCTION COUNTS—
USE THE LANCO DIE HEAD

The results obtained by one tubing manufacturer using the Lanco Head (Internally Tripped Type) for threading Wrought Iron Pipe Products is typical of results obtained everywhere with Landis Thread Cutting Equipment.

Threading 2 inch Regular Wrought Iron Pipe, this LANCO Die Head, operating at a cutting speed of 60 feet per minute, averages 150 threads per hour. Threads are held to close tolerance specifications.

Such performance explains why leading manufacturers throughout the world . . .

. . . LANDISize their THREADS

Investigate LANCO Internally Tripped Heads for your Threading Operations — *Write for Bulletin No. D-67.*

LANDIS MACHINE COMPANY

A Good Mechanic Knows and Cares For His Machine

LANDIS REG. U.S. TRADE—MARK PAT. OFF. THREAD TIPS

In the Interest of Efficiency, Better Workmanship and Higher Production

GOOD THREAD GRINDING PRACTICE NECESSARY FOR GOOD THREAD QUALITY AND HIGH PRODUCTION

The entire thread cutting operation evolves about the chaser or cutting tool. Therefore, it is essential that the chaser be ground properly to assure maximum operating efficiency.

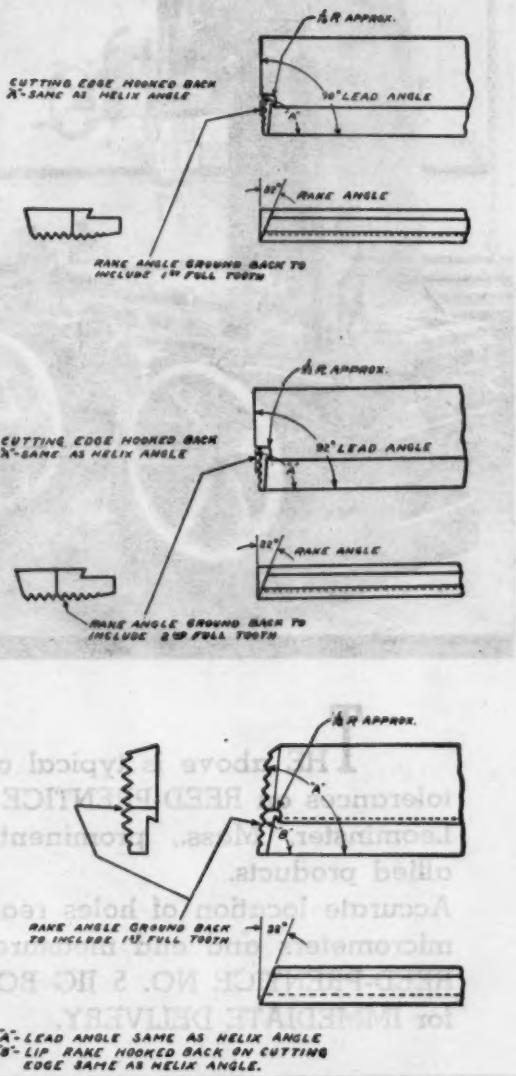
In the grinding of Landis tangential chasers there are but two angles to be considered—the lead angle and the rake angle. The lead angle is the angle made by the end of the chaser with the center line of the work. The rake angle is the angle to which the chasers should be ground to obtain a proper cutting action.

The following diagrammatic sketches are presented as an aid to better thread quality and longer chaser life. Figure No. 1 illustrates a hooked grind which is recommended for cutting straight threads on standard diameters and pitches without the use of a leadscrew or positive feed. This grind is usually recommended for use on heat treated materials and special alloy steels.

The grind illustrated by Figure 2 is recommended for cutting straight threads on special diameters and pitches without the use of a leadscrew or positive feed. This grind provides the correct lead angle for the diameter and pitch of the thread to be cut. It is designed to locate the cutting edges of the chasers on the cutting center line of the work and should be used when cutting special threads or standard thread forms on non-standard diameters in threading heat treated materials and alloy steels.

The Figure No. 3 illustrates the recommended grind for cutting straight threads with a leadscrew or positive feeding action. By employing this type of grind all lead controlling features of the chaser are removed so that the leadscrew or positive feed entirely controls the cutting action of the chasers.

There are, of course, many other factors which must be considered to obtain the maximum operating efficiency with your thread cutting die heads. These will be discussed from time to time in thread tips.

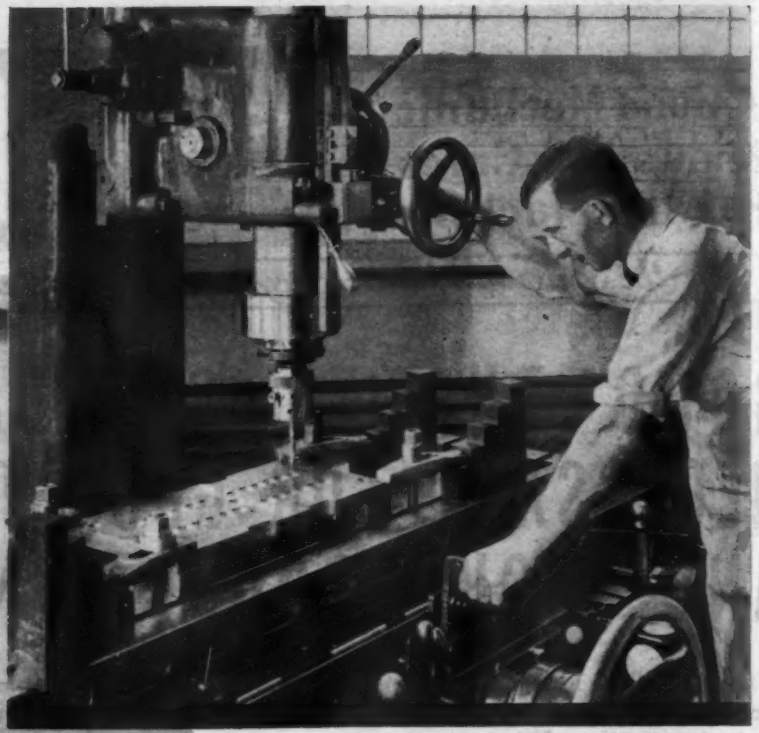

A.R. APPROX.
CUTTING EDGE HOOKED BACK A°-SAME AS HELIX ANGLE
10° LEAD ANGLE
A°
20°
RAKE ANGLE
RAKE ANGLE GROUND BACK TO INCLUDE 1ST FULL TOOTH
A.R. APPROX.
CUTTING EDGE HOOKED BACK A°-SAME AS HELIX ANGLE
32° LEAD ANGLE
A°
20°
RAKE ANGLE
RAKE ANGLE GROUND BACK TO INCLUDE 2ND FULL TOOTH
A.R. APPROX.
A°
B°
RAKE ANGLE GROUND BACK TO INCLUDE 1½ FULL TOOTH
20°
A°-LEAD ANGLE SAME AS HELIX ANGLE
B°-LIP RAKE HOOKED BACK ON CUTTING EDGE SAME AS HELIX ANGLE.

Be Threadwise—Employ LANDIS Long Life Tangential Chasers

WAYNESBORO, PENNSYLVANIA, U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

REED-PRENTICE *No. 5* JIG BORER



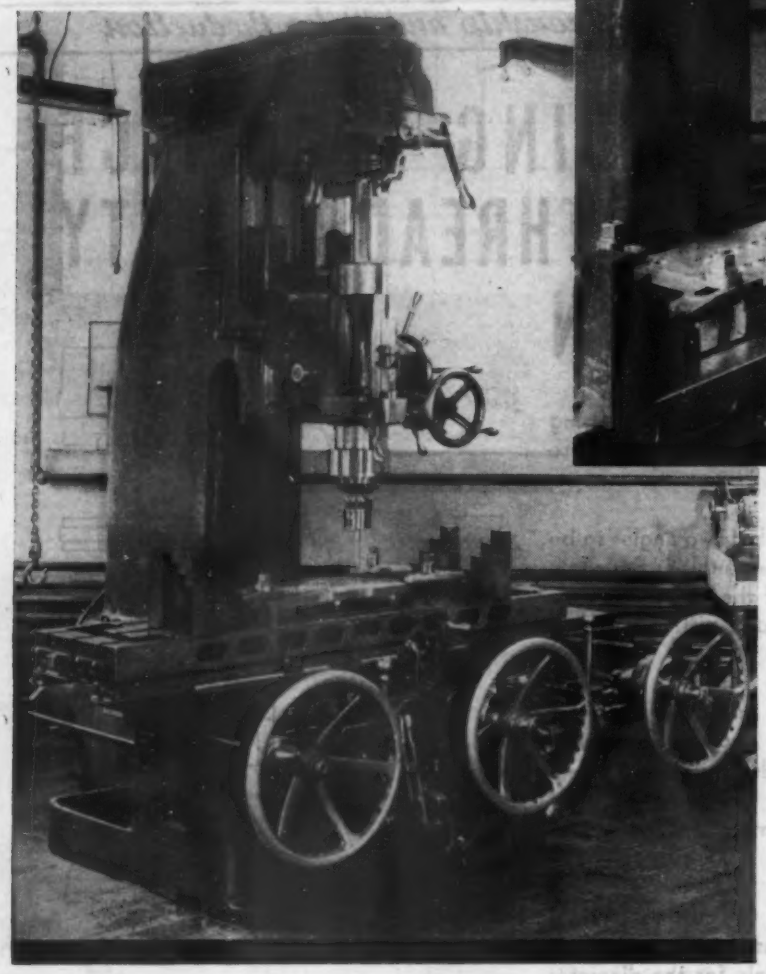


Plate 21" long x 11" wide x 1.25" thick of 1020 steel. Tolerance on all decimal locations of holes — plus or minus .0005 — must be held to matching plates.

SPECIFICATIONS

Longitudinal power feed	48"
Cross power feed	16"
Vertical adjustment head on column	15"
Vertical feed of spindle	9"
Maximum distance end of spindle to table	30"
Throat depth	20"
Rapid Power Traverse Either Direction: Longitudinal and cross (per minute)	100"
Table: Working surface (size overall)	68" x 16"
Spindle speeds, number	18
Standard Range spindle speeds, Helical Gear Drive	RPM—17—600
Number feeds for each spindle speed	8
Feed range for 18 speeds	.002 to .297
Shipping weight	13,500 lbs.

THE above is typical of accurate work performed to strict Government tolerances on REED-PRENTICE No. 5 Jig Borer at plant of Guy P. Harvey & Son, Leominster, Mass., prominent manufacturers of plastic injection molds and allied products.

Accurate location of holes readily accomplished by dial indicators and inside micrometers and end measures furnished as standard equipment.

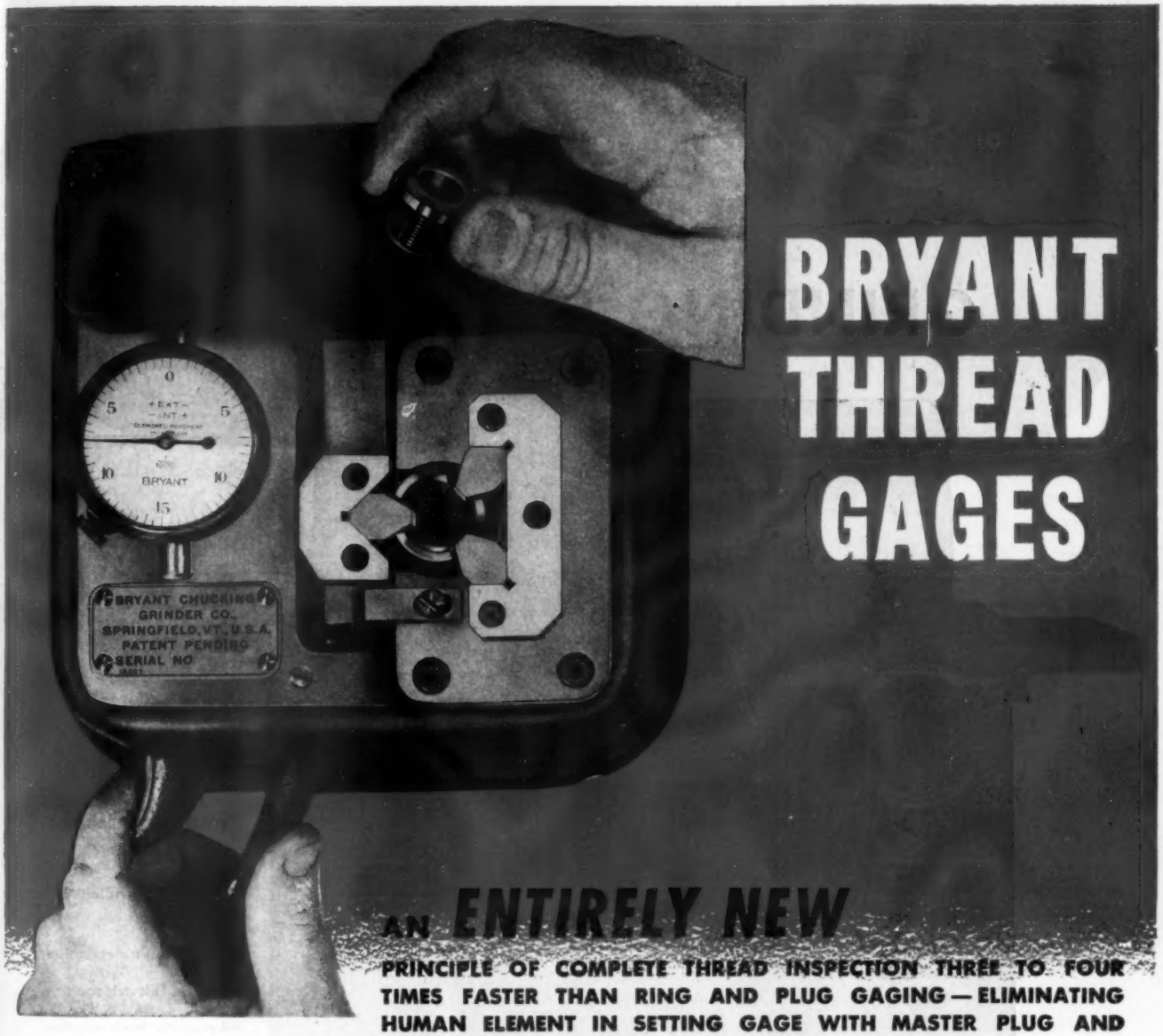
REED-PRENTICE NO. 5 JIG BORER and NO. 5 VERTICAL MILLER are available for IMMEDIATE DELIVERY.

MACHINE TOOLS

REED-PRENTICE CORP.

WORCESTER MASS., U.S.A.

NEW YORK OFFICE
75 West St.
New York 6, N. Y.
CLEVELAND OFFICE
1213 W. 3rd St.
Cleveland 13, Ohio



BRYANT THREAD GAGES

AN *ENTIRELY NEW* PRINCIPLE OF COMPLETE THREAD INSPECTION THREE TO FOUR TIMES FASTER THAN RING AND PLUG GAGING — ELIMINATING HUMAN ELEMENT IN SETTING GAGE WITH MASTER PLUG AND DURING INSPECTION OF WORK PART.

- One unskilled operator replaces four or five skilled inspectors.
- Gives complete over-all inspection in a few seconds.
- Thread segments have many times the life of ring and plug gages.
- Master gage accuracy transferred quickly to production parts.
- Available in three standard models. (Special sizes on request.)

The NEW BRYANT THREAD GAGE checks the entire circumference of internal and external threads in a few seconds. The operator merely drops the part on the work rest, releases the control lever, and gives the work a *partial* turn only. The dial reading shows the accumulated inaccuracies in lead, taper, pitch diameter, thread form, and the presence of burrs or surface inaccuracies.

The Bryant Thread Gage makes it possible—*as never before*—to transfer the measurements of master thread gages accurately and quickly to the parts being produced—it eliminates tedious, slow, and expensive methods requiring skilled inspectors.

Write today for illustrated folder No. G2 which gives complete details.

BRYANT CHUCKING GRINDER COMPANY

SPRINGFIELD, VERMONT, U. S. A.

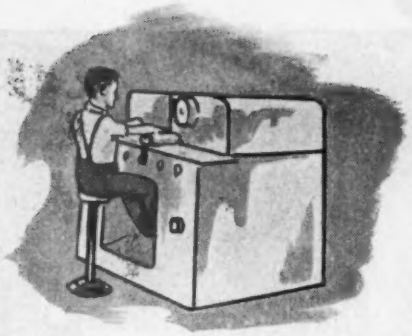
Easy Operation
for
GRINDING SMALL PARTS

4" TYPE H PLAIN HYDRAULIC GRINDER

- Automatic grinding cycles
- Wheel reset mechanism
- Grouped electric controls
- Automatic work rotation and coolant flow control
- Ample leg room
- Built-in wheel dresser

LANDIS TOOL
Precision Grinders

LANDIS TOOL CO. •



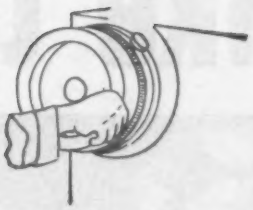
Easy Operation

For easy grinding machine operation, as many machine movements as possible should be automatically controlled. This reduces operator fatigue and generally increases production.

Another requirement is that all controls and adjustments can be made quickly and positively by the operator. Manually operated machine movements should also be easy and convenient to make.

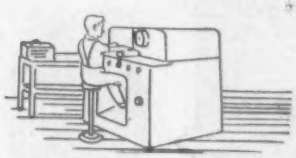
Check the features of the Landis 4" Type H Plain Hydraulic Grinder. You will find that all these requirements have been met. Everything practical has been done to relieve the operator, and still speed up production. For full details, write for Catalog A 44. 6

"Better Grinding" explains the basic principles of precision grinding. Invaluable for both the operator and the man responsible for grinding. Write for your copy today.



The wheel reset mechanism for hydraulic straight infeed eliminates a very common cause of work spoilage. On the Landis Type H the wheel is automatically reset upon the conclusion of either grinding cycle, straight infeed or traverse.

All electric controls are grouped in front at the left-hand side of the bed. A master start button serves as a work jog. A master stop button provides extra safety. Selector switches control coolant flow. A work speed selector is conveniently located at the front of the machine.



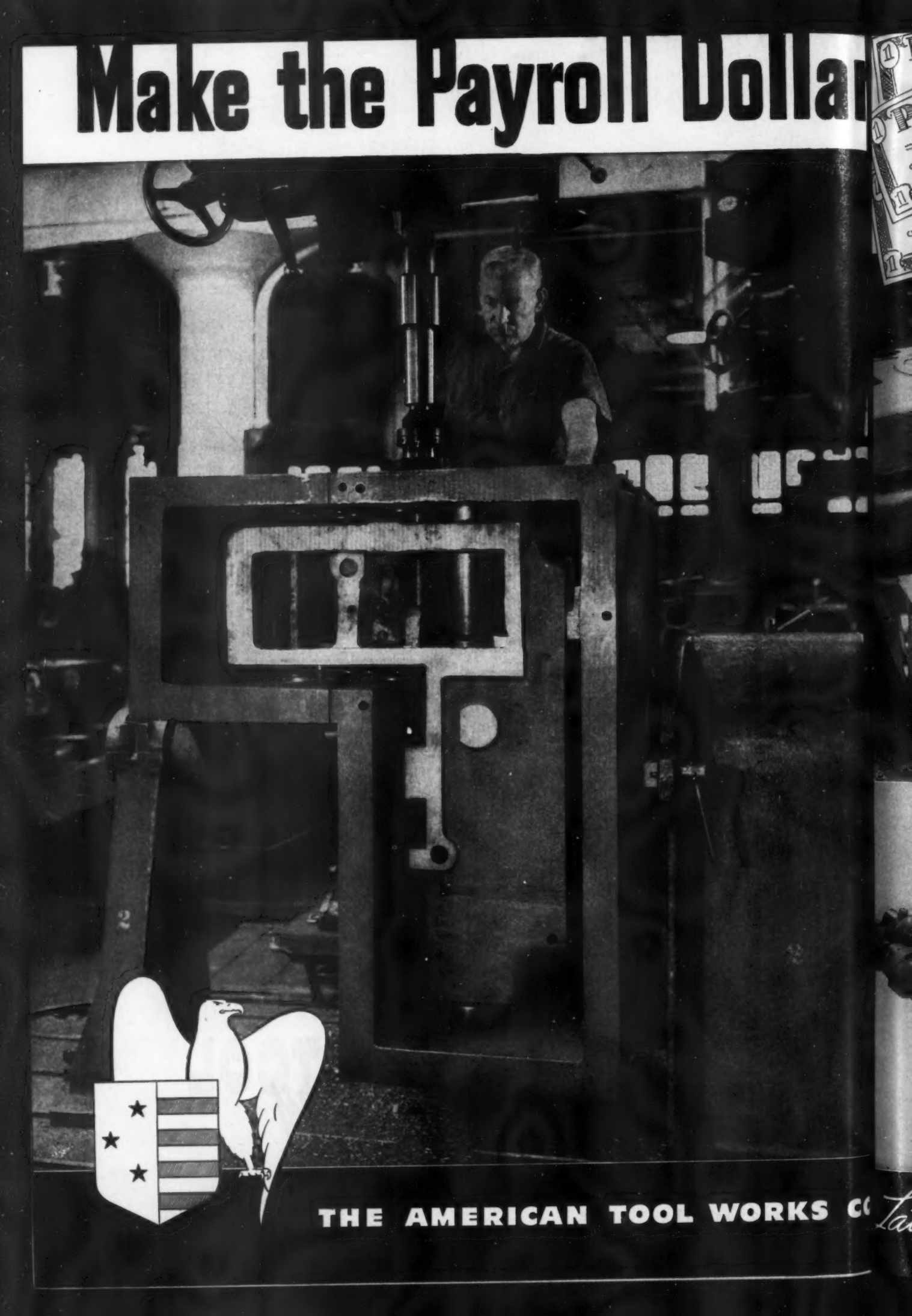
A large recess in the front of the bed gives the operator sufficient leg room so as to make him completely comfortable if he wishes to operate the machine from a sitting position. All controls are also convenient from a standing position.

For compactness, the wheel dresser is built into the footstock base. The traverse reversing lever is provided with two stages either side of its center position. One stage is for traverse grinding, the other for wheel dressing. Both these speeds are adjustable and independent of each other.

LANDIS TOOL *Company*

WAYNESBORO, PA.

Make the Payroll Dollar



THE AMERICAN TOOL WORKS C

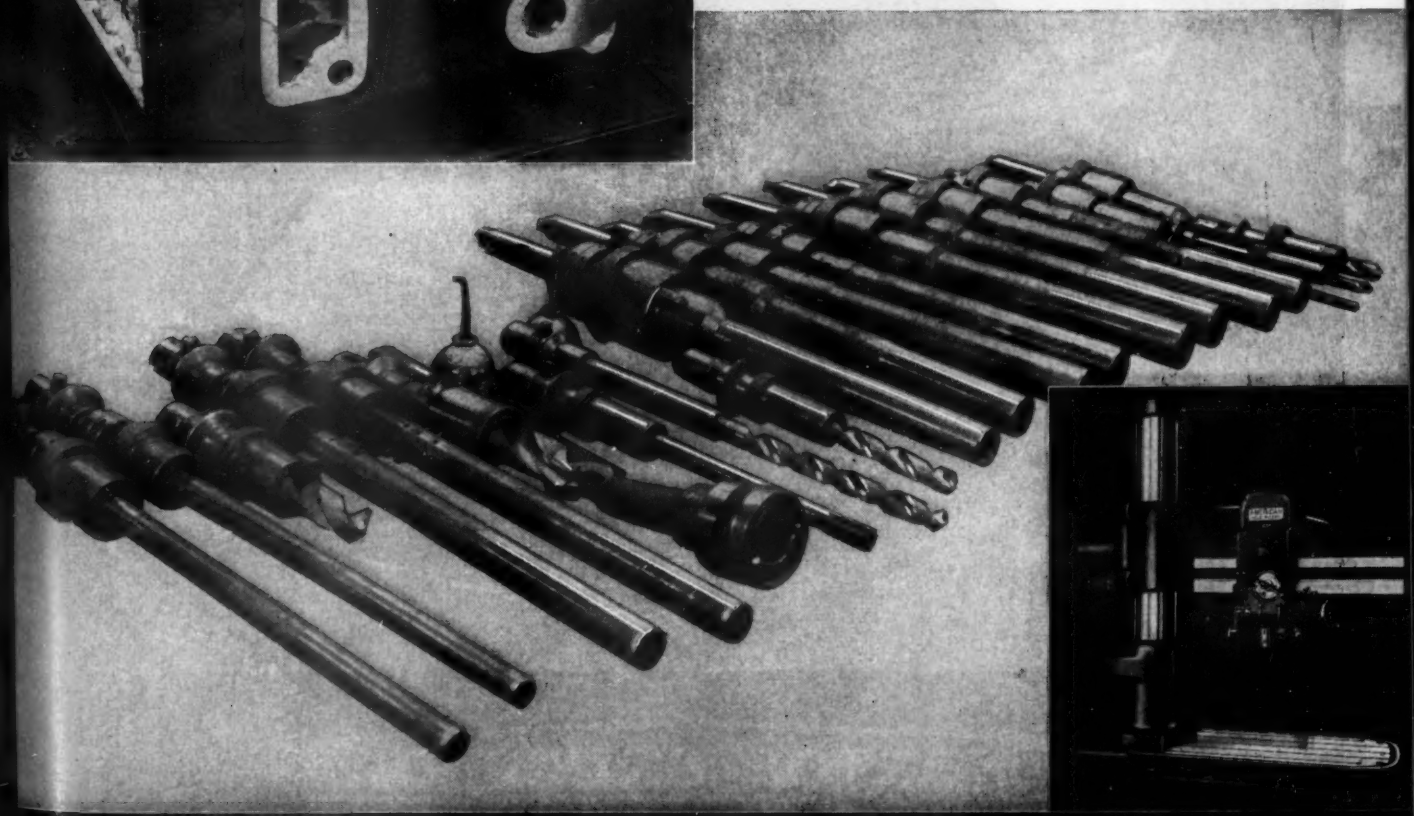
Produce More

Use "American" Hole Wizard Radials and the new trunnion stand technique for boring, facing, drilling and tapping.

These illustrations show a head frame being machined on an "American" Hole Wizard Radial Drill through a revolving jig mounted on an indexing trunnion stand with outboard support and tools used for the various operations.

When a jig is mounted on an indexing trunnion stand, it is easy for the operator to swing it from one plane to another, whereas, base mounted jigs, must be shifted, rolled or lifted, resulting in the expenditure of infinitely more operator energy and harmful jarring of the work in the jig.

For further advantages offered by the combination of "American" Hole Wizard Radials and indexing trunnion stands, write for Bulletin No. 458.

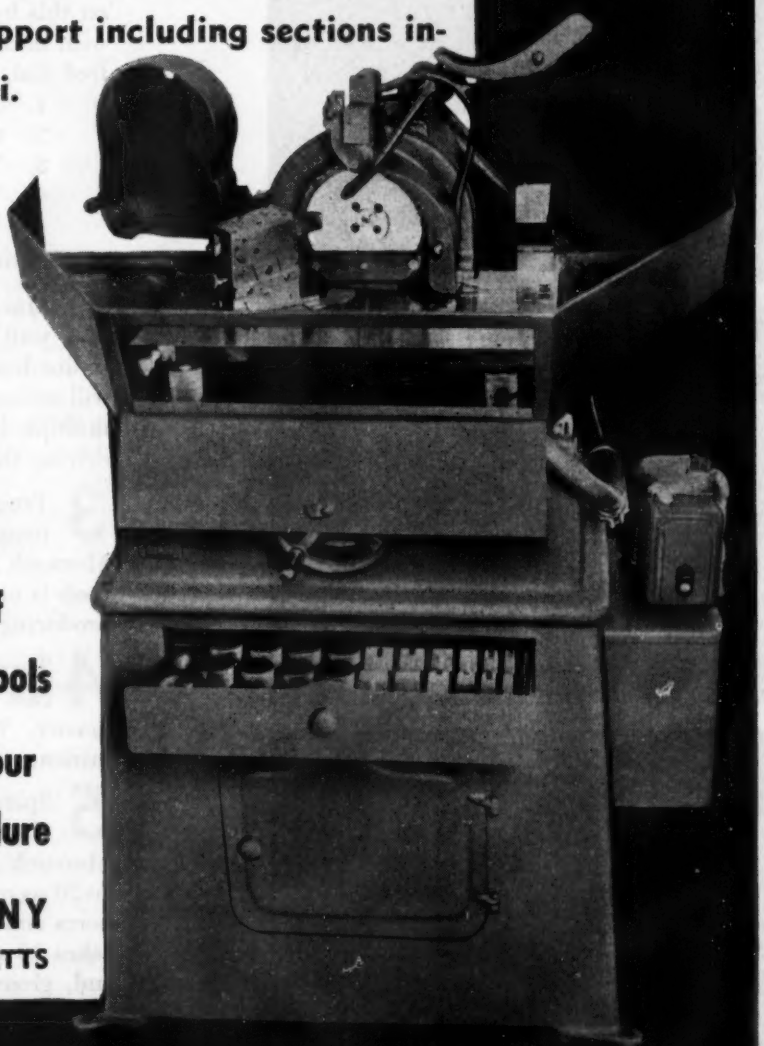


Lathes and Radial Drills **Cincinnati, Ohio U.S.A.**

Announcing
The
NORTON
BURA-WAY
PRECISION FORM GRINDER

The New Principle
IN TOOL GRINDING

The Norton Bura-way Grinder combines new principles in the design of cutting tools in a machine which generates, reproduces and maintains relief angles constant as measured in the direction of feed. This provides the entire cutting edge of a tool with a uniform, adequate support including sections involving curves and radii.



The NORTON Bura-way

Will Lengthen Tool Life

Will Increase Production

Will Reduce Inventory of Production Tools

Is Readily Adapted to your Tool Room Procedure

NORTON COMPANY
WORCESTER 6, MASSACHUSETTS

If it's a turning job

The examples shown here illustrate just a few of the ways in which Monarch Turning Machines can be utilized to save time and cut costs. These are the result of the resourcefulness and ingenuity of operators, foremen, plant management and Monarch engineers.

1 Utility of Monarch Lathes is shown in this illustration of a bomb plug. First, the hub is turned. Then, chucking on this hub with a 3-jaw chuck, and using a square turret with multiple positive carriage stops and clips on the cross-feed dial, these operations are performed:

1. Face
2. Countersink hole
3. Turn OD
4. Turn shoulder
5. Neck
6. Chamfer back edge
7. Rough thread
8. Finish thread
9. Chamfer thread

Actual machining time—five minutes, 25 seconds.

2 Much time is saved by boring twelve holes in a double wall casting at one time. The jig is also made to swivel to line-bore a hole in the opposite plane. One Monarch Lathe will accommodate very wide varieties and sizes of work to be multiple-bored in jigs with special driving fixtures for driving the multiple-boring bars.

3 Truck bevel-pinion, 10¼″ long, being turned from a template, with diameters and tapers as indicated, on a Monarch Magnamatic. Set-up time with template and rear tools is only 15 minutes. One operator tends two machines, producing 32 pieces per hour.

4 Turning the shape and contour of a mold from a master cam and a thin metal template on a Monarch Shapemaster. With Monarch-Keller electric controls, the most intricate contours can be turned with speed and precision.

5 Spindle speeds of 5,000 rpm permit machining this aluminum housing in 38 seconds, floor to floor, on a Monarch 10″ Production Lathe, to a tolerance of .0003″. In 20 seconds, the operator turns OD flange, faces flange end, bores and chamfers inside and outside. The second operation takes 18 seconds to turn OD, face inside flange, face small end, groove, and chamfer small end. The high-speed precision operation of this new Monarch Lathe offers great cost-cutting possibilities.

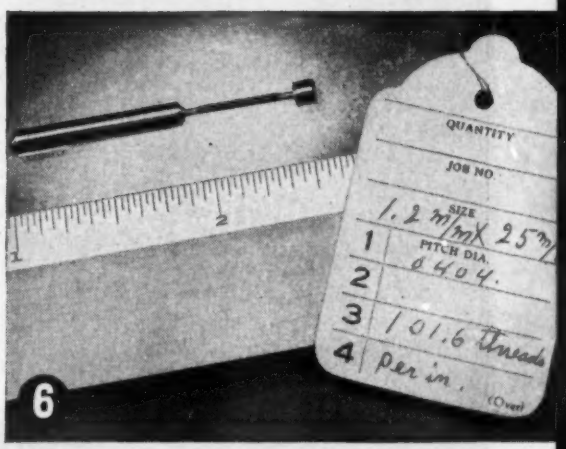
6 101.6 threads per inch, chased on a Monarch 10″ Precision Toolmaker's Lathe. Gear train carries special gears for 101.6 threads per inch. Lathe is equipped with

Monarch

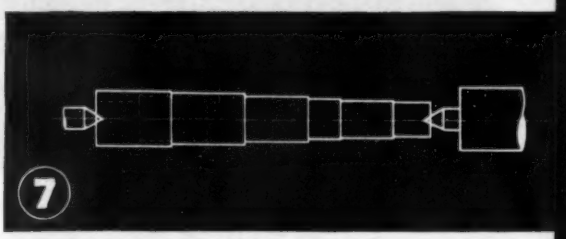
...see MONARCH

Monarch's electric leadscrew reverse and rapid return. Threads are chased toward the headstock at 425 rpm, and carriage returned to starting position at 1000 rpm, or faster if desired.

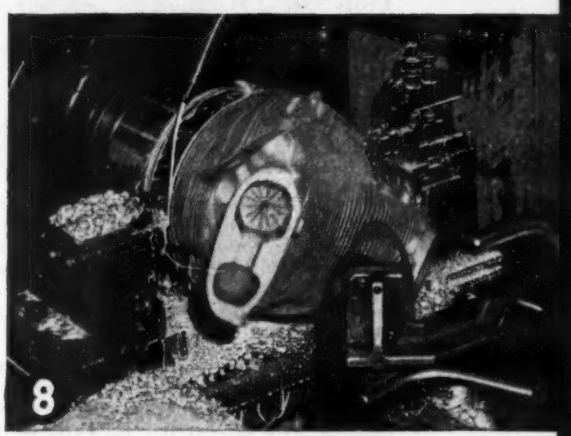
7 Machining time on this shaft was cut 23% by using a Monarch Automatic Sizing Lathe with Automatic Feed Changes. The job has five diameters, with feed rates automatically ranging from ½" to 2" per minute, determined by depth of cut. Without automatic feed changes, all diameters would be machined at the feeding rate for the starting diameter.



8 Rough turning, facing and back facing cylinder head flanges on a Monarch Lathe. Work is gripped in an air chuck on a rough surface. Alignment is checked with special fixture in tailstock. Capstan handwheel permits quick movement of fixture to and from work. Tool blocks, on front and rear of cross slide, hold forming and turning tools. Front tools do part of operation, then feed is reversed in apron; slide traversed for rear tool operation, with power feed and working to automatic diameter stop. Only one set-up required.



9 One lathe and operator are used on this job, with a single set-up, instead of three separate set-ups as job was first done. Turning outside diameters, forming groove, straddle facing sides and chamfering four outside corners were done in eight minutes on a Monarch 18" Model BB Lathe.



Of course, the outstanding precision, ease of control, smooth operation and the ability of Monarch Lathes to stand up under heavy pressure, all were finally responsible for the results obtained.

If any of these examples suggest ways of cutting your present or future costs, Monarch engineers will gladly work with you. Send us sketches or blueprints with sufficient description for a complete job analysis, and we'll make recommendations. If it's a turning job, ask Monarch!

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO

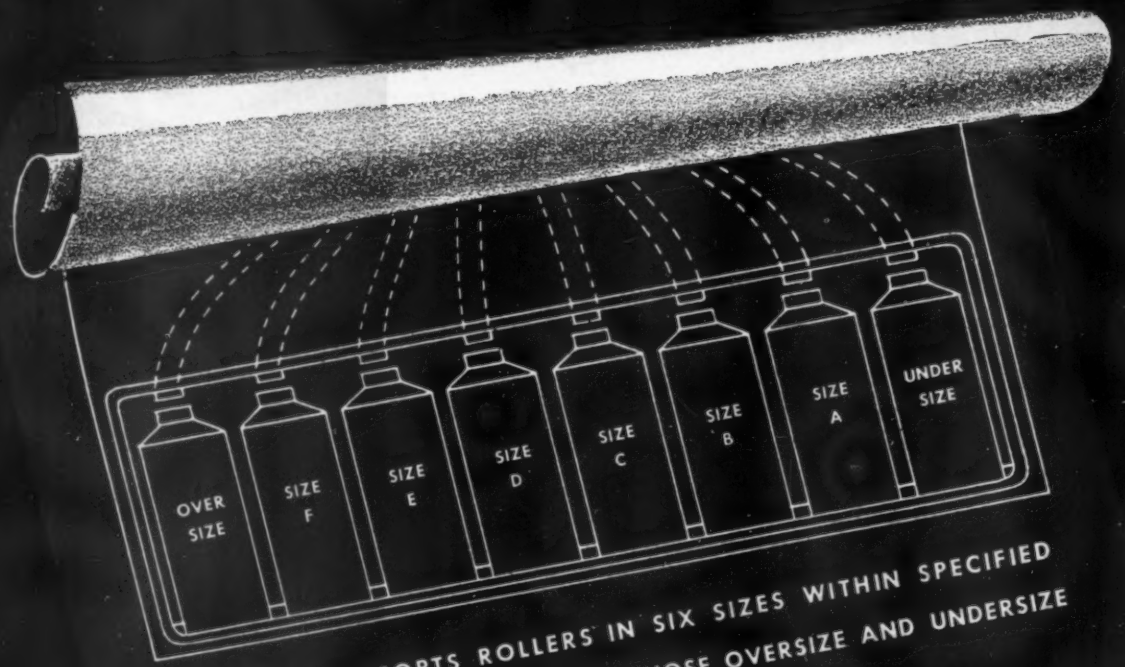
BRANCHES

622 W. Washington Blvd. Chicago 6, Ill.
10465 Carnegie Ave. Cleveland 6, Ohio
635 Industrial Office Bldg. Newark 2, N. J.
512 Empire Bldg. Pittsburgh 22, Pa.
801 Fisher Bldg. Detroit 2, Mich.

Representatives in principal cities

Saves Time

AT THE PUSH OF A BUTTON •



GAUGES AND SORTS ROLLERS IN SIX SIZES WITHIN SPECIFIED LIMITS—REJECTING SEPARATELY THOSE OVERSIZE AND UNDERSIZE

Cross Special Machines not only save time and manpower but are more accurate, as the human element is minimized. The machine shown is a good example.

The operator places the rollers to be gauged in the hopper and presses a button. The machine does the rest. It picks up the rollers, conveys them down the feeder tube where they are pushed into position for gauging.

First for length—two electronic switches control a pair of solenoids which in turn operate a control gate. If the roller is too long, the gate swings to allow the roller to drop down a chute into the can for long rollers . . . if too short, into another chute . . . but if within specified limits, it's passed on for diameter gauging.

Next, for diameter—it passes between two hardened gauging blocks where, if undersize, it will drop out of line into a container, but if it is of sufficient diameter, it will be carried forward to drop down a chute at one of the six stations for satisfactory sizes. Oversize rollers are carried on to drop through the oversize chute.

It is a simple matter to make a complete changeover of the machine for gauging rollers of different lengths and diameters.

Cross Engineers are prepared to help lower your costs and assist with manpower difficulties by designing, building and installing special automatic machinery in your plant.

Other Cross Special Tools include machines which complete one or a combination of turning, milling, drilling, boring, reaming, tapping, or grinding operations, automatically, at the push of a button.

A new Cross Catalog contains 35 detailed case histories of successful Cross Special Machines. For your copy, write on your letterhead to THE CROSS COMPANY, Detroit 7, Michigan, Dept. 61.

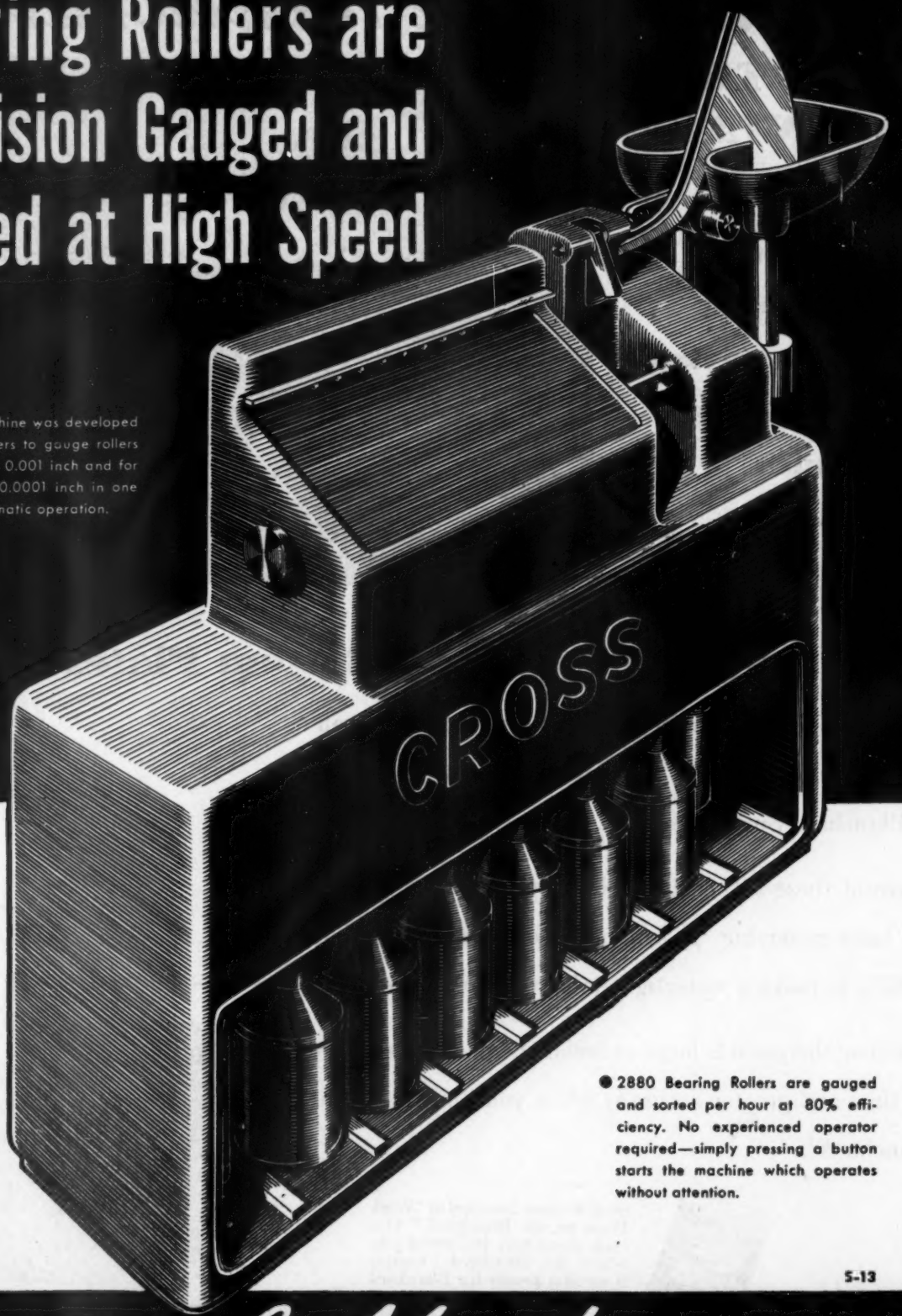
MACHINE TOOLS

CROSS

New York • Detroit • Chicago

Bearing Rollers are Precision Gauged and Sorted at High Speed

● This Special Machine was developed by Cross Engineers to gauge rollers for length within 0.001 inch and for diameter within 0.0001 inch in one continuous, automatic operation.



● 2880 Bearing Rollers are gauged and sorted per hour at 80% efficiency. No experienced operator required—simply pressing a button starts the machine which operates without attention.

S-13

Special Machines •

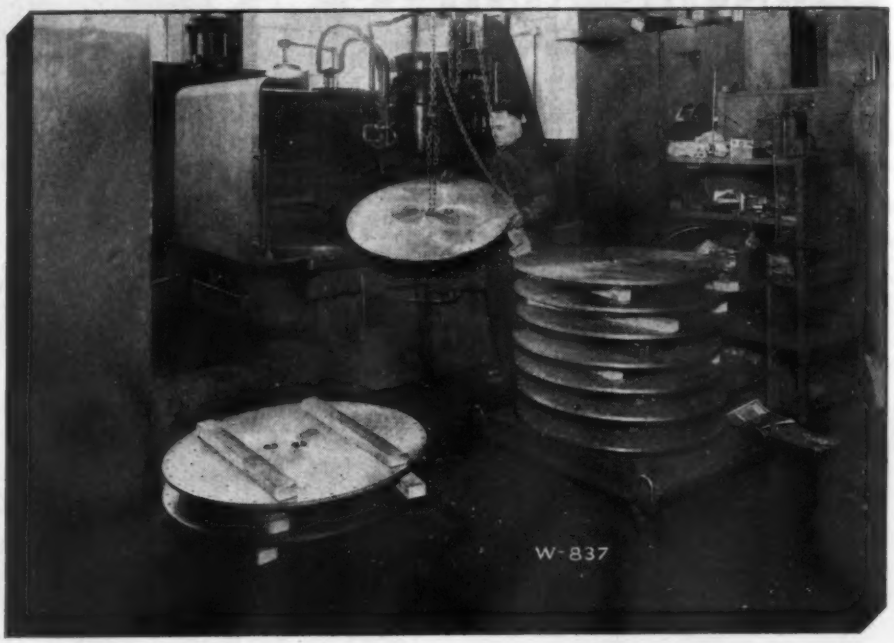
for automatically performing any one or a combination of metal cutting operations

TURNING · MILLING · DRILLING · BORING · REAMING · TAPPING · GRINDING

"Put it on the Blanchard"

...GET THESE ADVANTAGES

Production ✓
Adaptability
Fixture Saving
Operation Saving
Material Saving
Fine Finish
Flatness ✓
Close Limits

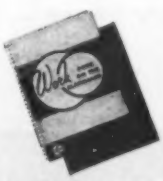


Grinding Cast Iron Bottom Plates

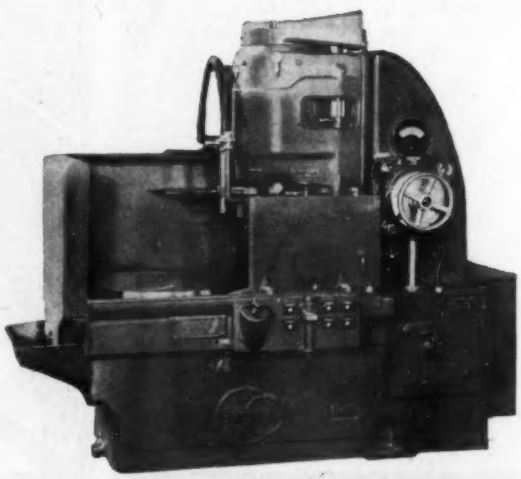
This is an excellent example of the large work that can be easily ground on the 36" magnetic chuck of the No. 18 Blanchard Surface Grinder.

Three of these 36" cast iron bottom plates are ground per hour removing $^{1}/_{32}$" of metal on one side, within .0005", to make a watertight joint without gaskets.

Whether the piece is large or small there is less setting-up time and greater accuracy when you "put it on the Blanchard".



Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.



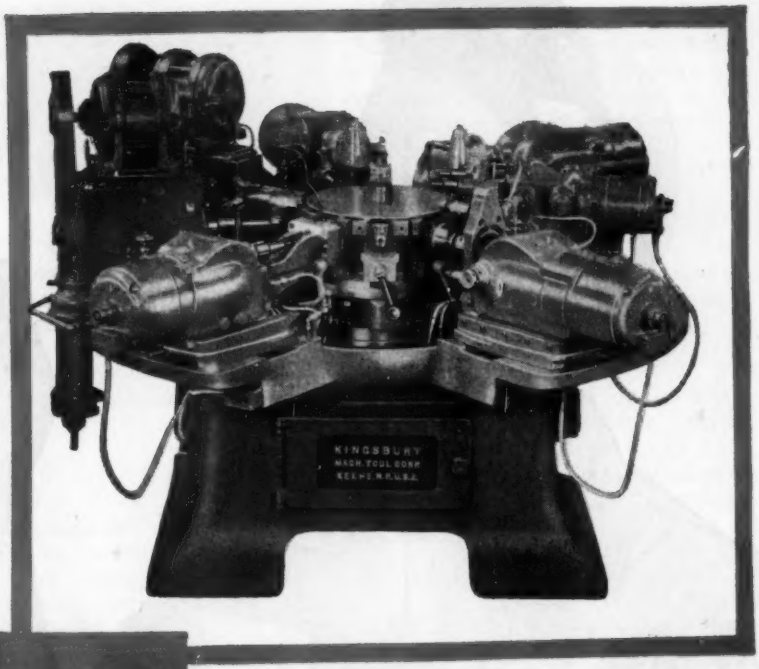
No. 18 BLANCHARD SURFACE GRINDER

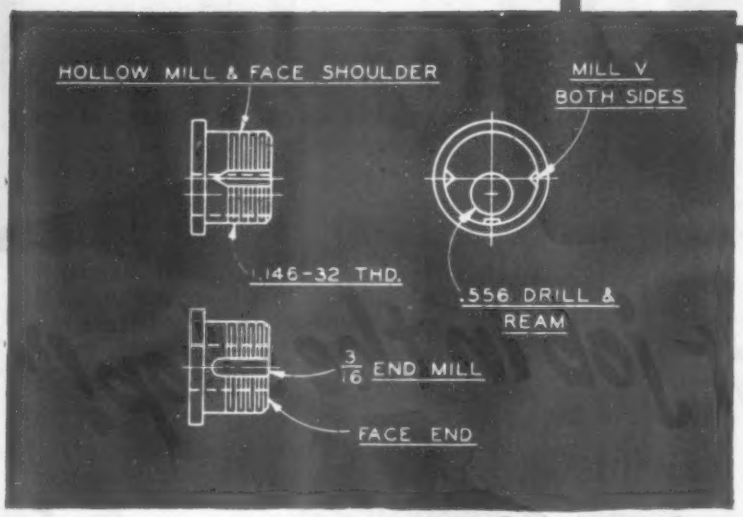
BLANCHARD

The **BLANCHARD** MACHINE COMPANY

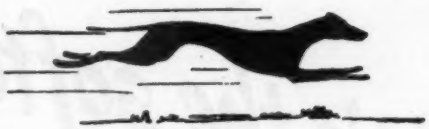
64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

Ability to handle widely different operations at top speed proves the value of versatility





THIS IS A FLEXIMATIC SPEED UP JOB



FLEXIMATIC

by KINGSBURY

KINGSBURY versatility is well exemplified in the widely different machining operations performed on bronze lock cylinders. For example, note that hollow milling, facing, V-milling, drilling, reaming, end milling and end facing are included in this set-up on a Model GD FLEXIMATIC. By being able to handle all these operations with a *single chucking of the work,* production is stepped up tremendously.

Whether it's a lock part or a complicated piece involved in ordnance production, the FLEXIMATIC can be depended on to meet exacting requirements. Its versatility is practically unlimited because of the basic nature of the method utilized in building up standard units around an indexing turret, each unit designed for handling a specific operation. Not only does this method provide for a wide variety of operations simultaneously but also makes change-over readily possible to meet the requirements of other jobs which call for still different machining combinations.

Whatever the set-up, high production and utmost precision are assured by FLEXIMATICS.

KINGSBURY MACHINE TOOL CORPORATION

KEENE NEW HAMPSHIRE U S A

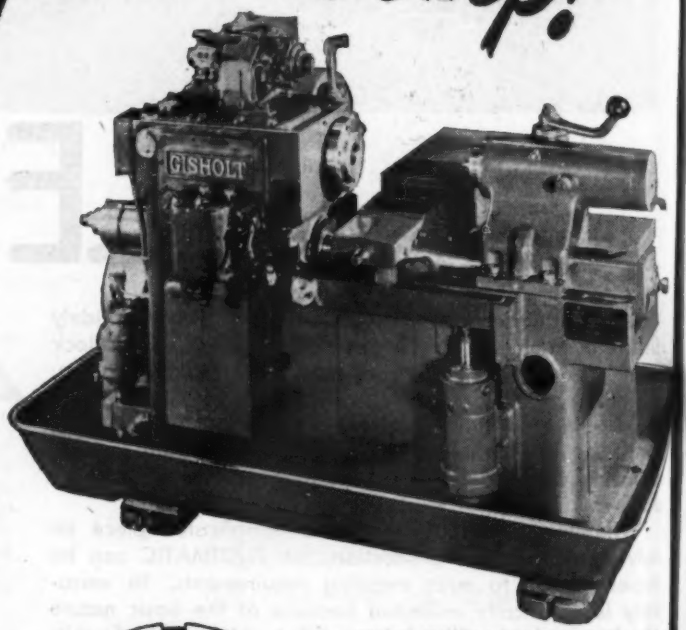
"Mine's the softest job in the shop!"

"I admit it! I know less about machining than anyone in the shop. But I get more of it done. And that's the truth!"

THAT'S right! And it's happening in hundreds of busy plants today where the Gisholt Hydraulic Automatic Lathes have taken over—each doing the work of several manually operated machines—releasing skilled machinists for other work where their skill is needed.

Anyone can learn, in a very short time, to operate the Gisholt Hydraulic Automatic Lathe. What's more, one operator can usually tend two, or even three, machines. For it requires but little more than loading the machine and removing the work.

It's another wartime lesson that will stand many users in good stead long after the war is over.



GISHOLT MACHINE COMPANY
1201 East Washington Ave. • Madison 4, Wisconsin

Look Ahead . . . Keep Ahead . . . With Gisholt Improvements in Metal Turning

GISHOLT

THE GISHOLT HYDRAULI AUTOMATIC LATHE is the pra tical solution for large volume m chining and handles a wide varie of between-centers and chuckin work. With but one simple control, performs a complete cycle of machi ng operations, giving you the adva tage of multiple cutting, unifor accuracy, and lower costs. Comple information on request.

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINE

The CONE AUTOMATIC MACHINE COMPANY sees many GOOD THINGS AHEAD

It is reported that . . . . . .

A recently patented heating plate has two elements from which four degrees of heat may be obtained by using them singly or in combination as well as in series or parallel.

get ready with CONE for tomorrow

A new patent covers the use of perforated plates at the bow of a small, fast motorboat which permits the hull to ride on a cushion of foam.

get ready with CONE for tomorrow

Spraying the interior of a freight car or truck with dry ice is being tried as an inexpensive method of refrigeration.

get ready with CONE for tomorrow

Serious consideration is being given to the making of illuminating gas near the coal mines and its delivery by pipe line.

get ready with CONE for tomorrow

Cigarette paper, formerly a French monopoly, is now being successfully made in this country.

get ready with CONE for tomorrow

A capsule has been developed that is said to be effective in the prevention of seasickness in about 75% of the cases tested.

get ready with CONE for tomorrow

Cloth is being made from shredded redwood bark mixed with wool.

get ready with CONE for tomorrow

Experiments are being made to determine the suitability of animal blood for human transfusion.

get ready with CONE for tomorrow

Shafts for generators are now being squeezed into shape with dies.

get ready with CONE for tomorrow

A new plant processes 25,000 pounds of milkweed floss per day.

Shoal draft boats with tunnel sterns are made more efficient by the use of a small stand-pipe over the propeller which is kept full of water by a vacuum pump. The propeller is thus constantly surrounded by water although above the water level.

get ready with CONE for tomorrow

Anthropology is not popularly thought of as a commercially useful science, but anthropologists were consulted in designing seats for aircraft, gas masks, and goggles, and they might well be turned loose on the problems of private and public furniture after the war.

get ready with CONE for tomorrow

Airplane propellers are now being made of sponge rubber over a metal core.

Apparatus now in use by our army is expected to make it possible for civilians to forecast weather accurately as much as 24 hours ahead.

get ready with CONE for tomorrow

One of the country's largest chemical companies states that 46% of its gross sales for last year consisted of products unheard of fifteen years ago.

get ready with CONE for tomorrow

Rayon is being used for tire cord, parachutes, paint brushes, pump packing, bullet-proof gas tanks, lint-free gloves, electrical insulation, gas-proof clothing, cartridge bags, felt, and rugs.

get ready with CONE for tomorrow

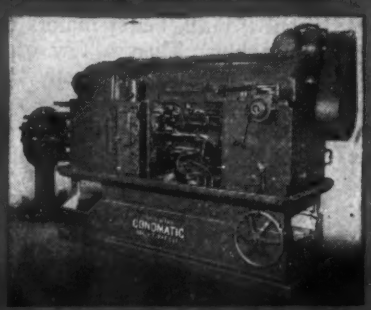
Optimistic producers of synthetic rubber say that, in the future, people will buy new automobiles to go with their old tires.

get ready with CONE for tomorrow

Ball bearings are now being made small enough to replace the jewels used in many precision instruments.

Tomorrow's production should eliminate second operations

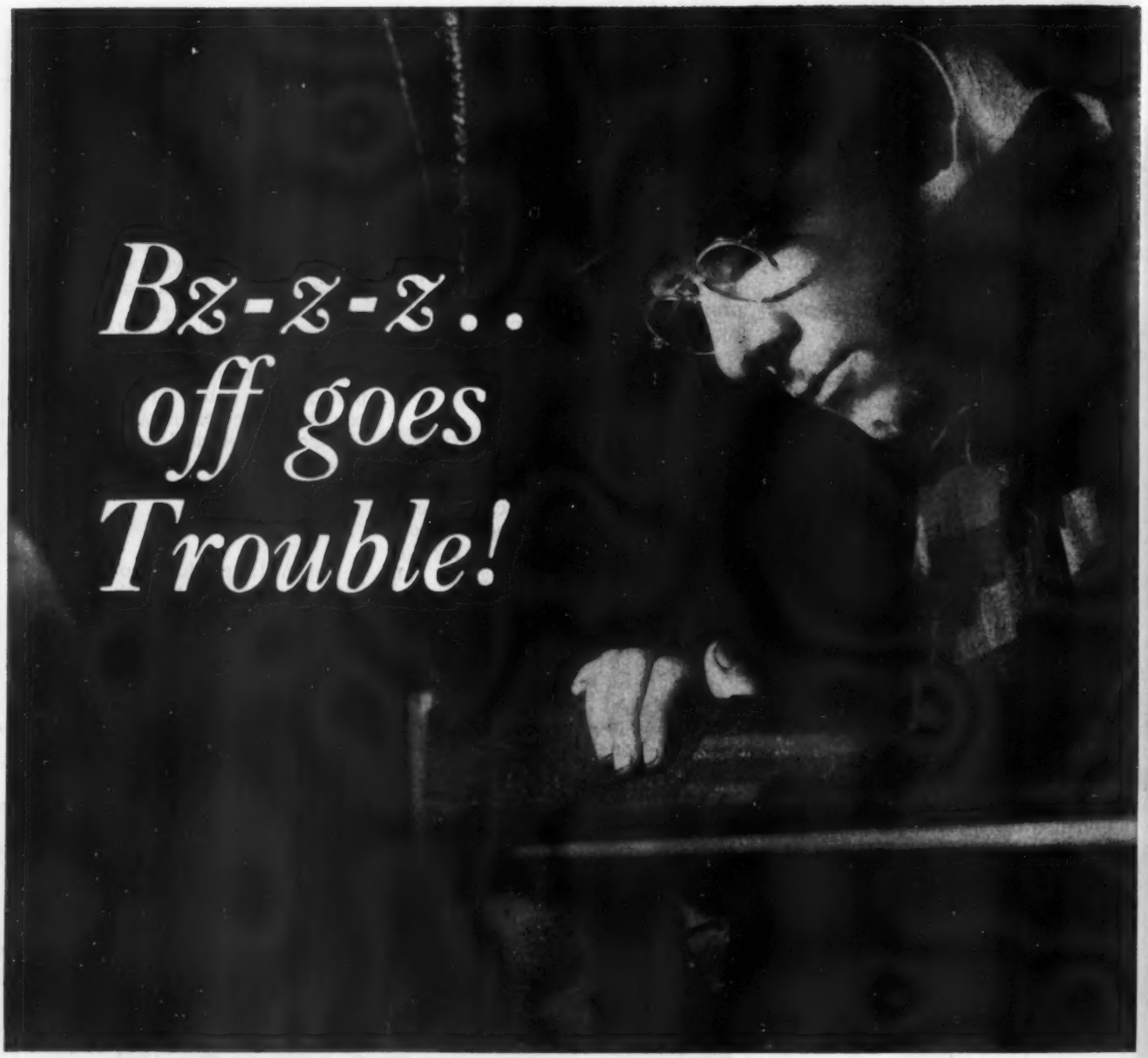
The 8-Spindle Conomatic produces these wheel hub bolts from SAE 1030 in 34 seconds each. Slot milling in the large diameter and stamping the letter on the end are done without stopping the spindle. Conomatics reduce costs, save time, and eliminate second operations.



CONE

AUTOMATIC MACHINE CO., INC. ★ WINDSOR, VERMONT, U. S. A.

10



A SOLID STRUCTURE such as a motor shaft rarely fails from the inside out—it fails from the outside in. Moral: get rid of every surface tool mark or irregularity that might someday invite cleavage.

That's what Stan Brothers, above, of Allis-Chalmers Norwood Works is doing. As he painstakingly polishes the shaft—back and forth, back and forth—he works down to a finish that's slicker than silk.

Why does he follow his job so intently? Because in 17 years at Allis-Chalmers Stan has learned that he and every other employe has a *personal* stake in every motor.

He knows that when he helps build a *great* motor for you he helps make a *friend* . . . and that friends are something no company and its workers can have too many of.

Actually, it was friends that put Allis-Chalmers importantly in the motor business in the first place.

Years ago, Allis-Chalmers began building motors only because it wanted, to put on heavy-duty equipment it built, better motors than it could buy. Then a few of those motors were sold separately to one customer, a few to others . . .

And the reputation those motors earned—"You can depend on Allis-Chalmers Motors"—literally forced Allis-Chalmers into building electric motors in volume for the market!

So the very existence of Norwood Works is proof and reminder to every Allis-Chalmers coil winder, machinist, inspector, welder, brazer, painter, assembler—that *good work catches up with a company just as surely as bad work.*

That's why you can expect *good* work in every Allis-Chalmers motor! Allis-Chalmers, Milwaukee 1, Wis.

A 1728

A-C WE WORK FOR VICTORY WE PLAN FOR PEACE

YOU CAN DEPEND ON ALLIS-CHALMERS MOTORS

Union Cutters (as well as the famous Union Twist Drills, Reamers, and other popular cutting tools) are accepted nationwide for their accuracy in war production. In fact, their long-lasting qualities assure efficiency, even when used by inexperienced operators. Put Union Cutters to work . . . with proper care, they'll deliver the long term service and dependability so essential under today's severe conditions of constant use. Choose Union — the Tools you buy again!

UNION

-the Tools you buy again!

Union Twist Drill Co.
Athol, Mass.

S.W.Card
Butterfield
UNION

TWIST DRILL COMPANY

CARD means Quality

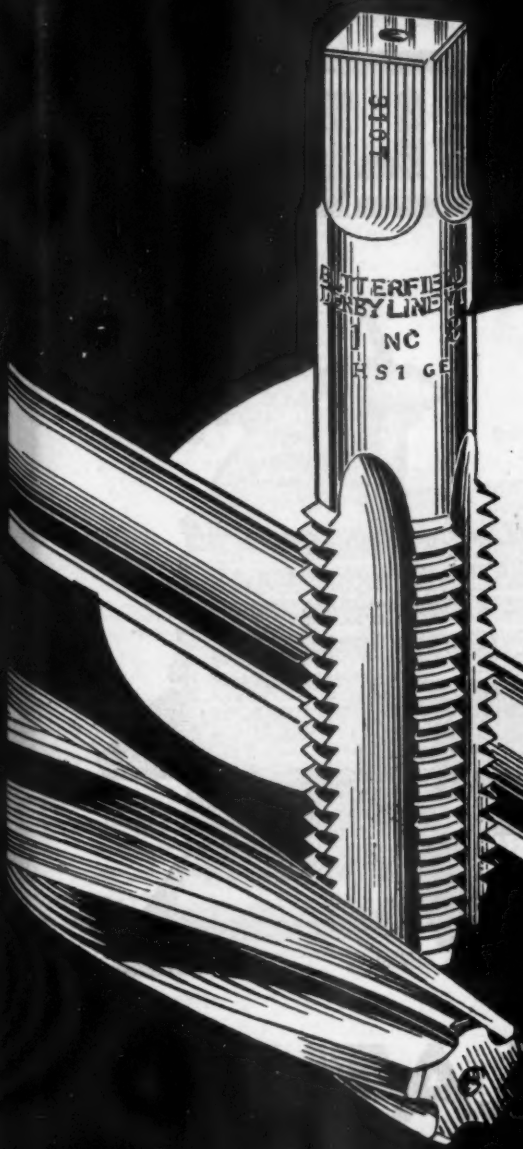
Card Taps are superior taps; they unfailingly meet the exacting demands for speed and high quality workmanship in war production. Their superiority is the result of a generation of research, experience and advanced metallurgical knowledge. When you need precision Taps . . . when you want accuracy, durability, toughness, remember – "CARD" means "QUALITY"!

S.W.Card
Butterfield
UNION

S. W. Card Mfg. Co.

Mansfield, Mass.

DIVISIONS OF THE UNION



Butterfields!

For REAMERS geared to today's heavy high production demands . . . . for TAPS that can take on the tough threading assignments of precision war production and deliver the maximum service on every tapping job, whatever the machine, the material or the degree of accuracy required . . . . use BUTTERFIELDS and be assured of top results in the quickest time!

Butterfield Division

Derby Line, Vt. *Rock Island, Que.*

S.W.Card
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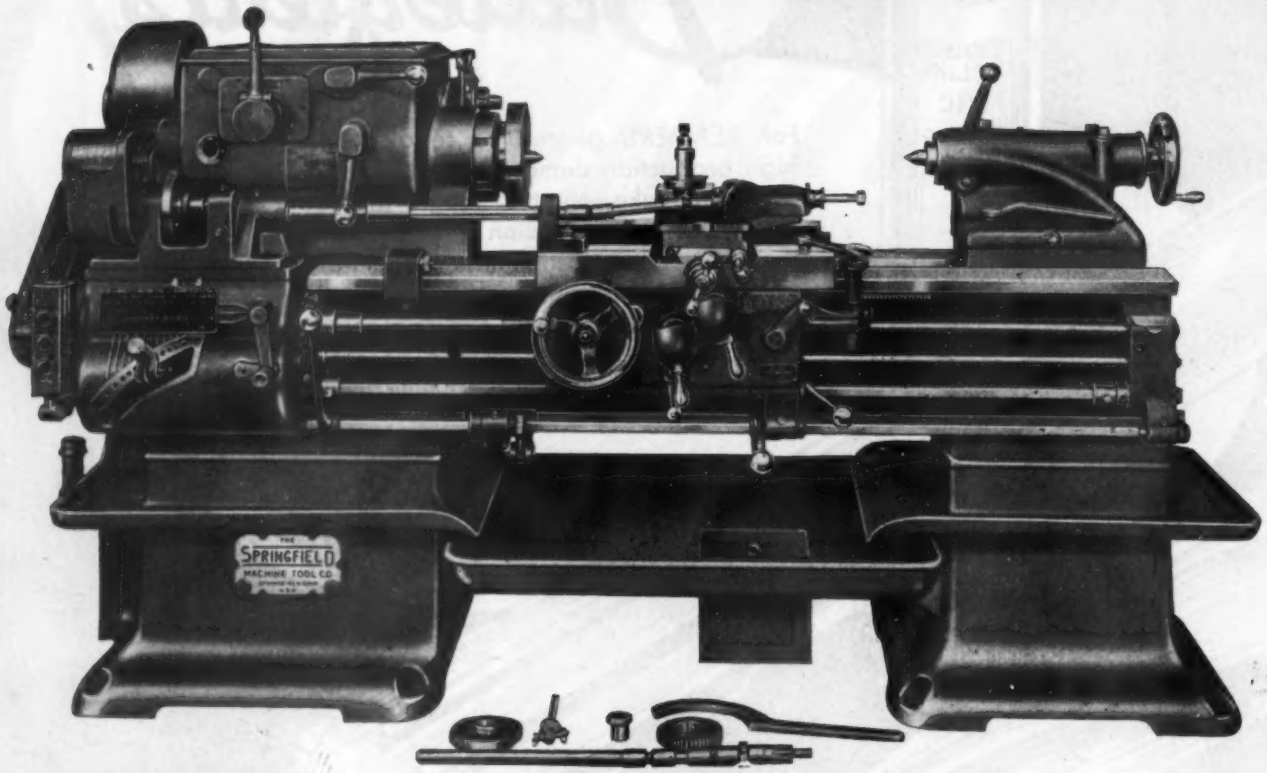
UNION

TWIST DRILL COMPANY

Choose

SPRINGFIELD



GEARED HEAD LATHES

From the ground up, a SPRINGFIELD Lathe represents superior construction and design. All heavy castings, including the bed, are cast in our own shop . . . gearing is designed for maximum efficiency . . . attachments demonstrate unusual engineering ingenuity . . . lubricating systems and power transmission are built to take it, 24 hours a day. In fact, to fully understand what SPRINGFIELDS can do for you, check their superior metal turning records in other shops . . . and judge for yourself.

Under current emergency conditions make it SPRINGFIELD Geared Head Lathe . . . they'll do your job better, now and later, too! Sizes range from 14" to 30". Write concerning deliveries, prices, etc.

The SPRINGFIELD MACHINE TOOL Co.

SPRINGFIELD OHIO U.S.A.

1. D-c motor
2. Control station
3. Electronic panel
4. Power transformer
Complete Drive in Four Units
(Note how easily the components fit into this compact jig saw.)

and now

Thy-mo-trol drive in fractional-hp sizes

The ideal drive for:

- Jig saws
- Lathes
- Drill presses
- Pumps
- Grinders
- Conveyors

and many other applications

Sizes down to ⅛ hp — smaller if needed.

And you get all these THY-MO-TROL advantages:

Constant speed—No Load to Full Load

No matter how much the load on your machine changes (within the adjustable preset torque limit), Thy-mo-trol drive will hold the speed very close to the point at which you set it.

Stepless Speed Control

You get complete adjustment of motor speed without steps—just by turning the speed-adjusting dial. And you can get a speed range of 20:1—or greater.

D-c Performance from A-c Power

You obtain all the inherent advantages of the d-c motor—and on a-c power.

Single Control Station

Starting, accelerating, control of speed, and stopping (by dynamic braking) are all controlled from a single, compact station.

How to Buy Thy-mo-trol

Just give our local office complete information about your requirements—nature of the load, speed range, horsepower, etc. Our engineers will select just the right electronic panel, motor, transformer and control station, the Thy-mo-trol drive components that will give you exactly the operating characteristics you want.

Standard drives can be obtained in ratings from ⅛ to 15 hp. If you need a higher or lower rating, let us know. Also, ask for Bulletin GEA-4025. *General Electric Co., Schenectady, N. Y.*

THY-MO-TROL DRIVE

Every week 192,000 G-E employees purchase more than a million dollars' worth of War Bonds

GENERAL ELECTRIC

MID-WEST Super-Cut WHEELS

IN YOUR GRINDING ROOM

Mean Better, More Economical Tool Sharpening

The tool grinding room equipped with MID-WEST SUPER-CUT grinding wheels is well prepared for *any* type of high-speed steel-sharpening job.

Made with our No. 2 grain (Special Aluminum Oxide) MID-WEST SUPER-CUT wheels are exceptionally cool cutting, virtually eliminating all danger of over-heating costly tools. They also cut remarkably fast and are *efficiently serviceable* much longer than most wheels of their type. Hence they are more economical.

Ask our local service engineer how MID-WEST SUPER-CUT wheels can reduce your grinding room costs.

MID-WEST ABRASIVE COMPANY

Manufacturers of Dependable Abrasives

Owosso Mich. — 1960 EAST MILWAUKEE AVENUE DETROIT 11, MICHIGAN — Rochester Pa.

HARDINGE

High Speed Precision

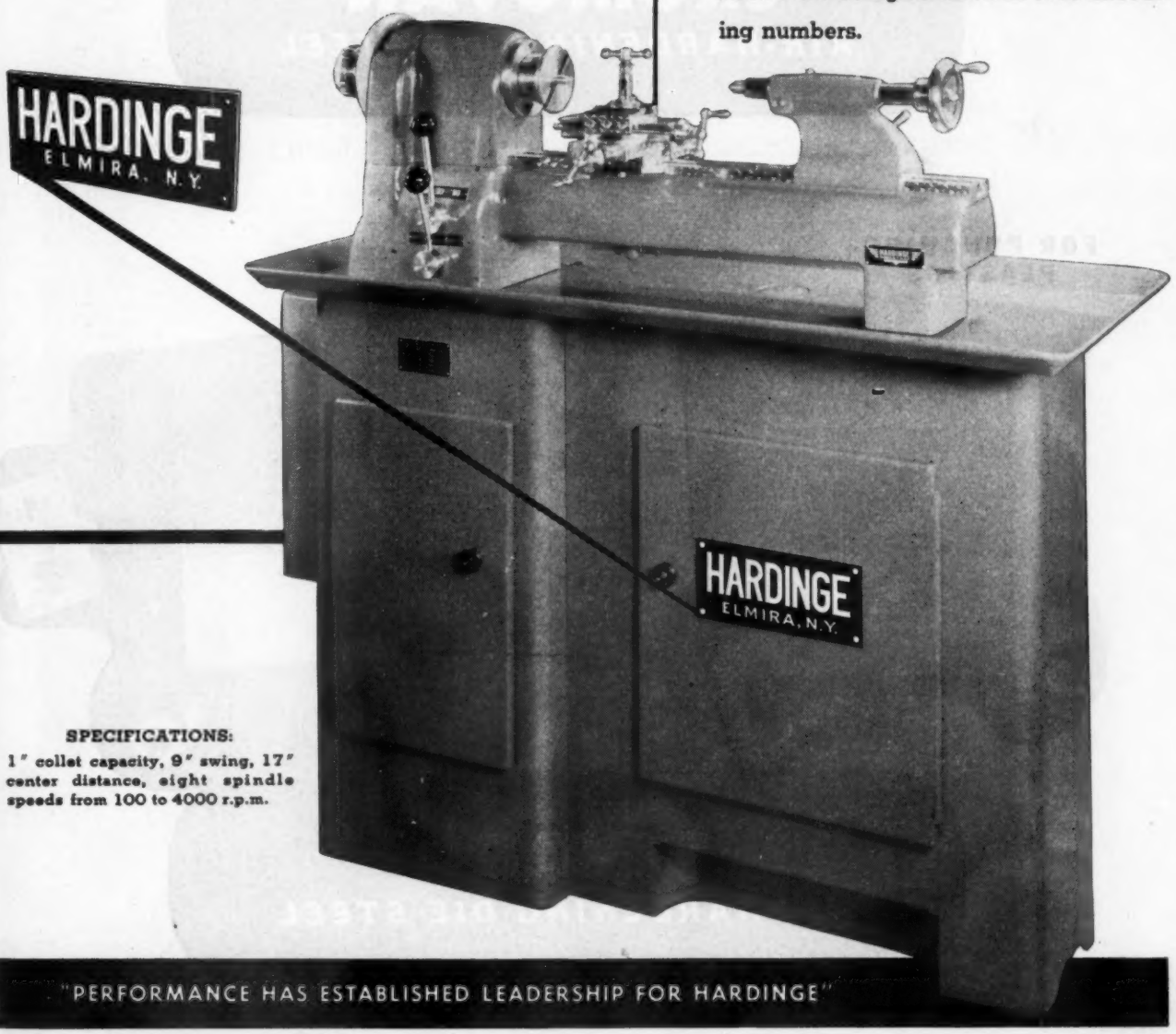
LATHE

is designed for accurate tool room work

Designed to meet requirements of extreme lasting accuracy, high spindle speeds and the ease in operation required for the smaller diameter work range found in every tool room, laboratory and production department.

The simplicity of operation enables relatively unskilled operators to produce parts to the necessary close limits without expensive tooling. Your larger, expensive equipment will not meet all of the foregoing requirements necessary for practical results and proper economy.

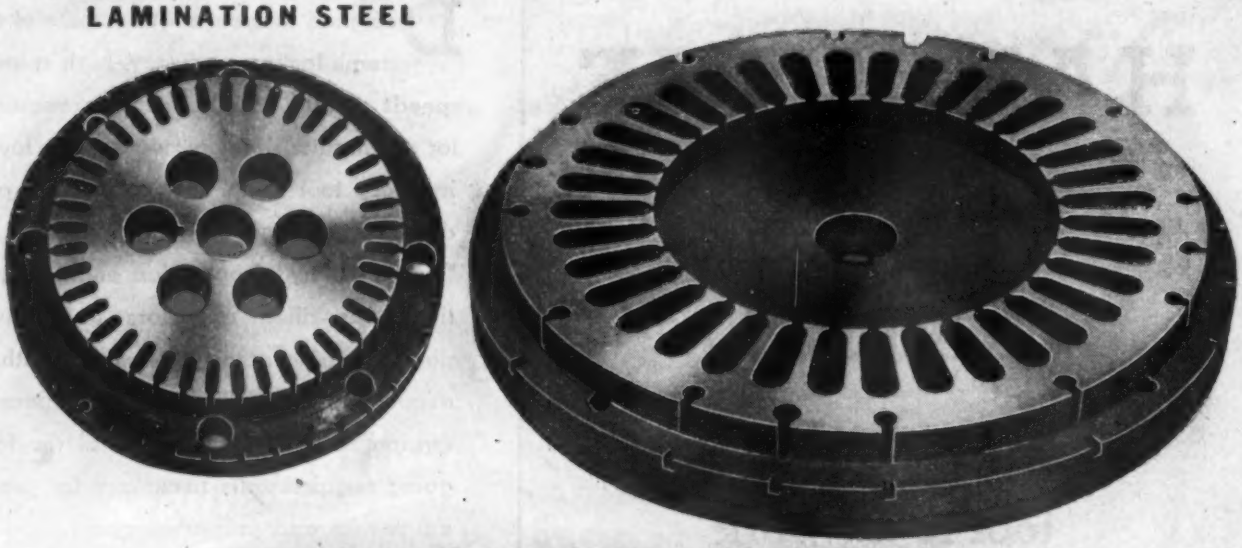
Because of the many advantages found through actual use, Hardinge Precision Lathes are being installed in ever increasing numbers.



SPECIFICATIONS:
1" collet capacity, 9" swing, 17" center distance, eight spindle speeds from 100 to 4000 r.p.m.

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

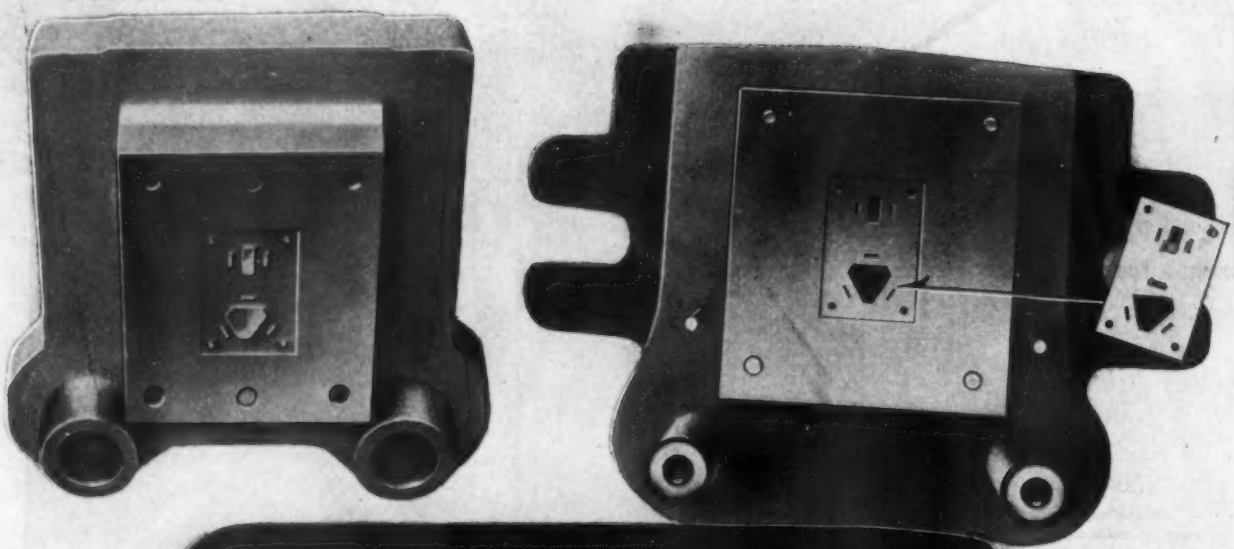
FOR BLANKING SILICON LAMINATION STEEL



CROMOVAN

AIR-HARDENING DIE STEEL

FOR PUNCHING PLASTICS



INVARO

OIL-HARDENING DIE STEEL

BOTH have their places

CROMOVAN FOR HIGH PRODUCTION—Where the production desired is in the hundreds of thousands or millions of pieces, air-hardening Cromovan is used for dies because of its unusual depth of hardness and high resistance to abrasion. Cromovan's wearing and cutting capacity is several times that of regular oil-hardening die steels and considerably more than that of high-speed steel. Write for "Cromovan" Bulletin.

INVARO FOR SHORTER RUNS—Used for intermediate production runs, oil-hardening Invaro maintains close tolerances much longer than water-hardening carbon steels. Tools and dies made of Invaro can be used without grinding after heat treatment; possess uniform surface hardness; have excellent cutting properties; are tough and durable. Send for Invaro Bulletin "SL-2003."

Firth-Sterling
STEEL COMPANY

ARMY NAVY

Offices: McKEESPORT, PA. · NEW YORK · HARTFORD · PHILADELPHIA · CLEVELAND · DAYTON · DETROIT · CHICAGO · LOS ANGELES

NOW AIR-HARDENABLE STEELS CAN BE SPOT WELDED . . . *NO BRITTLENESS*

Use this NEW TEMPERING ATTACHMENT* with your G-E Synchronous Electronic Control

The Hedstrom-Union Company, Fitchburg, Mass., makes use of this tempering control when welding X-4130 steel collars and shafts of helicopter-rotor blades.

IF medium-carbon steel, low-alloy steel, or high-alloy steel is resistance-welded in the normal manner, the chilling effects of the water-cooled electrodes will cause the weld nugget to be brittle and generally unsatisfactory.

This new attachment enables spot welds to be tempered, increasing toughness and ductility, without removing the work from the welding machine.

Just 4 Steps

1. Make the weld in the normal manner.
2. Chill to several hundred degrees (cool time on pulsation welding).
3. Pass welding current of a *definite value* for a *definite time* to raise the temperature to tempering level. (This attachment provides the necessary additional adjustment of welding current—time and magnitude—for tempering.)
4. Allow the weld to cool in the normal manner.

And 4 Advantages

1. Extends the use of your present welding equipment by enabling you to weld air-hardenable steels and temper the welds in the welding machine.
2. Enables you to make ductile welds in present-day, air-hardenable steels, thereby reducing rejects due to brittleness.
3. Can be used in conjunction with the main welding control to obtain preheat or postheat.
4. Easy to install, as few leads to the main control are needed.

More Information Available

Write today for our new bulletin, No. GEA-4201. *General Electric Company, Schenectady 5, N. Y.*

*For use only with G-E pulsation-type, synchronous controls which include heat control by the phase-shift method.

Buy all the BONDS you can—and *keep all you buy*

GENERAL ELECTRIC

RESISTANCE-WELDING CONTROL

Guard your hydraulic equipment against chatter and jumpy operation with **Marathon Terona** Oils. Their high viscosity index and low cold test assure smooth operation through the widest range of temperatures.

No worries about stability either. Even at peak temperatures, **Marathon Terona** Oils will not oxidize or sludge in service. You get increased pump efficiency as well as longer life for the oil, resulting in over-all savings.

Marathon Terona Oils carry the approval of leading pump manufacturers. They are immediately available in every necessary viscosity to suit the requirements of your hydraulic pumps.

If you wish, an Ohio Oil Company lubrication engineer will be glad to examine your equipment and make specific recommendations. Just write, wire or phone.

● **If the pump manufacturer has recommended compounded hydraulic oils for your equipment, Marathon Vepressa of the correct viscosity should be used.**

THE OHIO OIL COMPANY PRODUCES A COMPLETE LINE OF INDUSTRIAL OILS

MARATHON

The OHIO OIL COMPANY

General Offices: Findlay, Ohio. District Offices: Robinson, Ill., Indianapolis, Ind., Louisville, Ky.

PRODUCERS OF PETROLEUM SINCE 1887

STERLING

THE WHEELS OF INDUSTRY

The Cards (*And Sterling Wheels*) Are Stacked Against Our Enemies!

Sterling Catalog No. 44 is just off the press, offering important information about old and new items that department heads will want to study. Ask for your copy on your letterhead and it will be sent at once.

Sterling workers are stacking the "Wheels of Industry" against the best effort our enemies can muster. We realize that battles cannot be won in factories, but that they can be lost there! We know, too, that there is hardly any product for war that does not depend upon excellent grinding to get it into action faster. That is why Sterling Grinding Wheels are going into our furnaces faster than ever before . . why, in spite of wartime difficulties, you are receiving your wheels quickly.

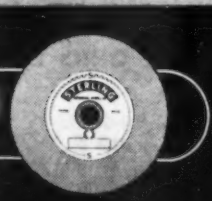
We believe it is worth a lot to have Sterling quality doing its share for victory in your plant. Hundreds of users of Sterling Grinding Wheels have seen them push up production and turn out better work. They have seen operator fatigue lessened and wheel-life lengthened. Costs, before and after Sterling Wheels are used, are the final, good reason for specifying them.

Case histories of what has happened in various industries after Sterling Wheels have been put on the job will be given you by our engineers. Take advantage of this experience in planning your production for war—or peace. Your letter will bring an engineer at no obligation. Write it today!

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY



NOW...MACHINES CAN HAVE MULTI-TRACK MINDS

For the first time—an automatic control that is as versatile as manual control

The Bullard "MAN-AU-TROL" principle of automaticity transfers to a simple automatic control, man's ability to think and act for himself . . . and with an accuracy and consistency far beyond any man's ability.

A machine, for example, can now be made to turn out a given part . . . and then can be changed over to machine an altogether different part . . . in a matter of hours, not days.

Thus the Bullard "MAN-AU-TROL" gives you the advantage of *increased production* and *lower costs* offered by special-purpose machinery . . . plus the advantage of complete flexibility within the range of manually operated machinery—flexibility that even includes manual operation, instantly, as desired.

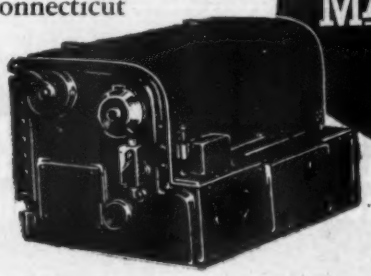
The Bullard Company, Bridgeport 2, Connecticut

BULLARD

MAN-AU-TROL

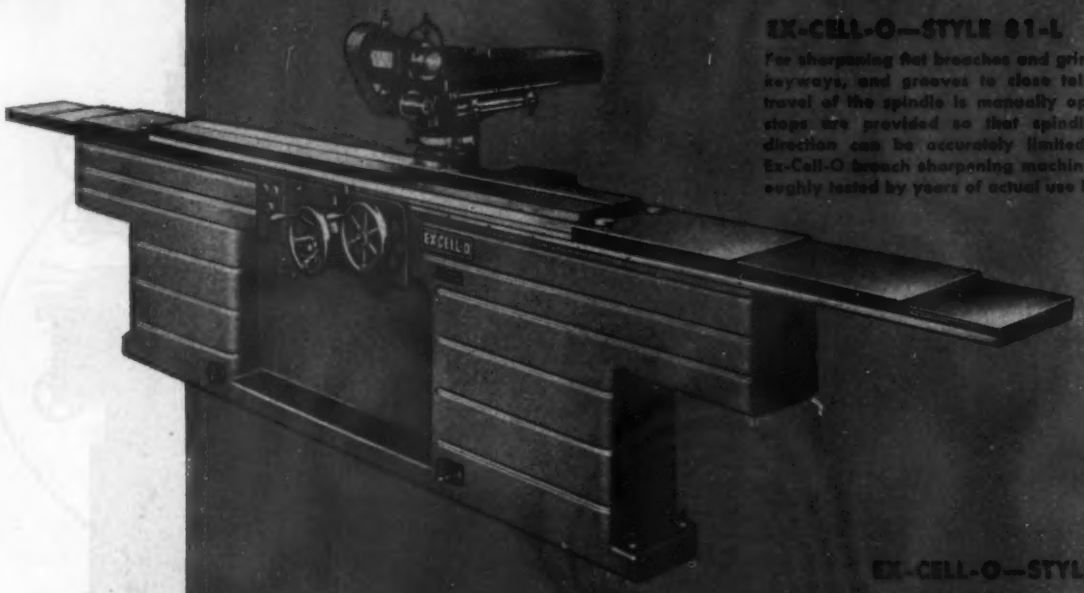
MASTER OF THE MACHINE

The automatic control that is as versatile as manual control



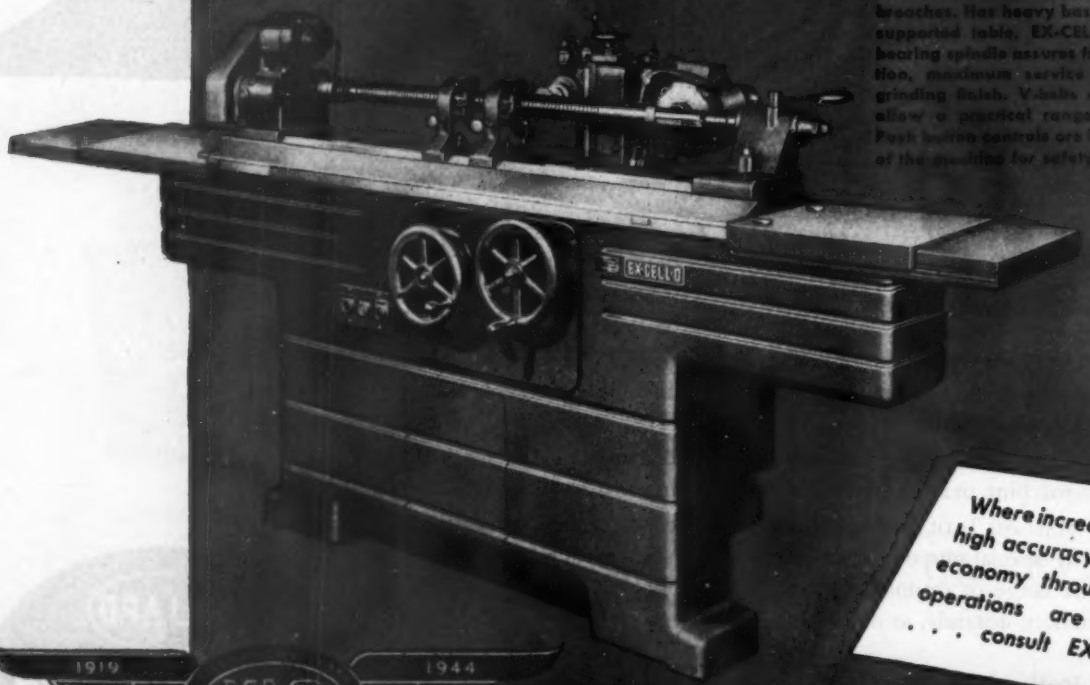
100% automaticity . . . no human or cumulative error . . . control to closest tolerances *— a tremendous cost advantage in competitive markets!*

Now . . . EX-CELL-O BROACH



EX-CELL-O—STYLE 81-L

For sharpening flat broaches and grinding straight slots, keyways, and grooves to close tolerances. The cross travel of the spindle is manually operated. Adjustable stops are provided so that spindle travel in either direction can be accurately limited when necessary. Ex-Cell-O broach sharpening machines have been thoroughly tested by years of actual use in Ex-Cell-O plants.



EX-CELL-O—STYLE 80

For economical sharpening of round broaches. Has heavy base and sturdy, well-supported table. EX-CELL-O precision ball bearing spindle assures freedom from vibration, maximum service life, and a good grinding finish. V-belts and 3-step pulleys allow a practical range of work speeds. Push button controls are located on the front of the machine for safety and convenience.

Where increased production, high accuracy, and greater economy through multiple operations are required . . . consult EX-CELL-O.

1919 XLO 1944

SPECIAL MULTIPLE WAY-TYPE PRECISION BORING MACHINES · SPECIAL MULTIPLE PRECISION DRILLING MACHINES · PRECISION THREAD GRINDING, BORING AND LAPPING MACHINES · BROACHES AND BROACH GRINDING MACHINES · HYDRAULIC POWER UNITS

SHARPENING MACHINES

Available in 4 styles for most Efficient Production

FOUR STYLES
EX-CELL-O BROACH SHARPENING MACHINES
No. 80—Small Machine for Round Broaches
No. 80-L—Large Machine for Round Broaches
No. 81—Small Machine for Flat Broaches
No. 81-L—Large Machine for Flat Broaches
For further information, write to Ex-Cell-O Corporation, 1200 Oakman Blvd., Detroit 6, Mich., and ask for specifications on new Ex-Cell-O Broach Sharpening Machines.

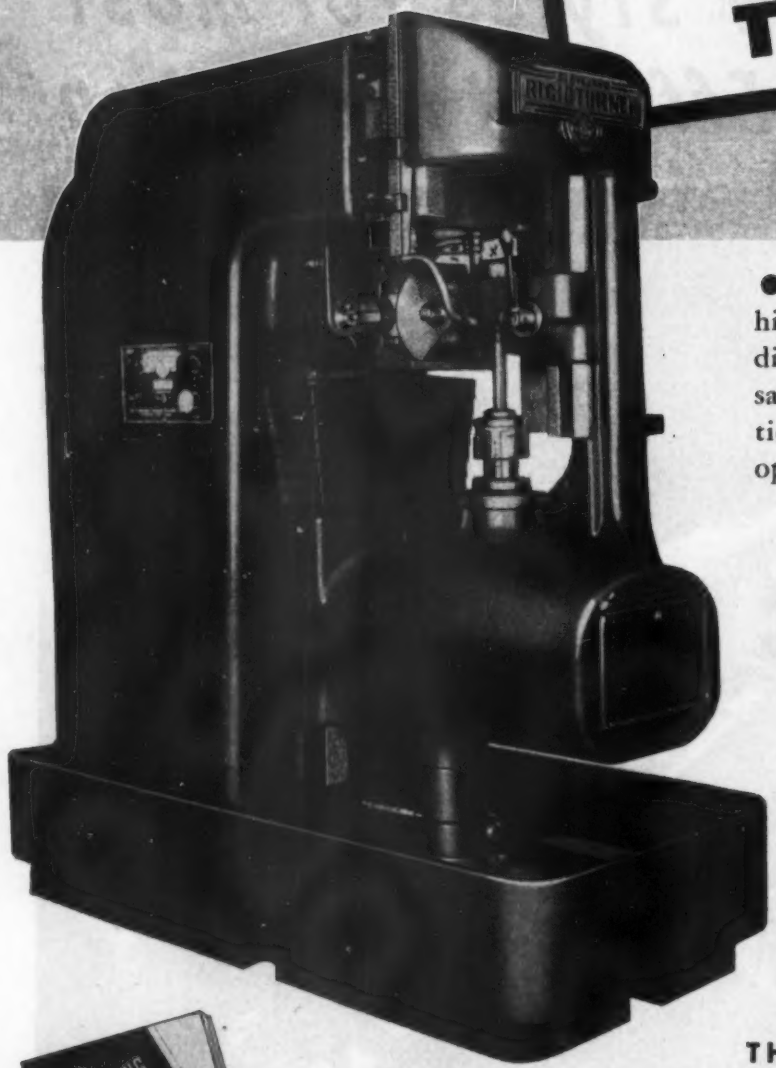
MANY years of experience in the production of broaches, broaching fixtures, and precision machine tools form the background for the design and manufacture of Ex-Cell-O broach sharpening machines. Each machine is built to give the utmost in speed, accuracy, and economical production. Each combines simplicity and ruggedness in construction, with modern streamlined appearance. These new Ex-Cell-O broach sharpening machines are special purpose machines. They are ideal for large production set-ups, and are advantageous also for occasional work. By the use of such machines, set-up time is highly minimized, and the hazard in changing equipment is practically eliminated.

EX-CELL-O CORPORATION
DETROIT 6, MICHIGAN

GRINDING SPINDLES · DRILL JIG BUSHINGS · CONTINENTAL CUTTING TOOLS · TOOL GRINDERS · DIESEL FUEL INJECTION EQUIPMENT · R. R. PINS AND BUSHINGS · PURE-PAK MILK CONTAINER MACHINES · PRECISION AIRCRAFT AND MISCELLANEOUS PARTS

THE RIGIDTURNER

THE ANSWER TO LOW COST *Multiple Diameter* TURNING



● The Rigidturner provides a fast, accurate, high production method of turning multiple diameters and advances many time and cost saving advantages—ease of operation—reduction in down time—minimum floor space—operation by unskilled labor.

FOR EXAMPLE

on the piece shown one complete cycle of the cutter completed the cut—a second pass gave the finishing cut and all diameters were duplicated as shown.

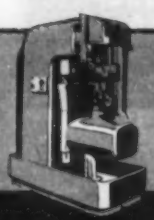
THIS BOOKLET

tells all about Rigidturners —what they do—how they do it—and how they can save time and costs on multiple diameter turning. — Write for one today. —

THE RIGIDTURNER

is adaptable to any shaft turning—provides accurate duplication on high production and ease and speed of changeover makes it most profitable on small lots.

CONSULT a Cleveland Hobbing Engineer on your multiple diameter work.

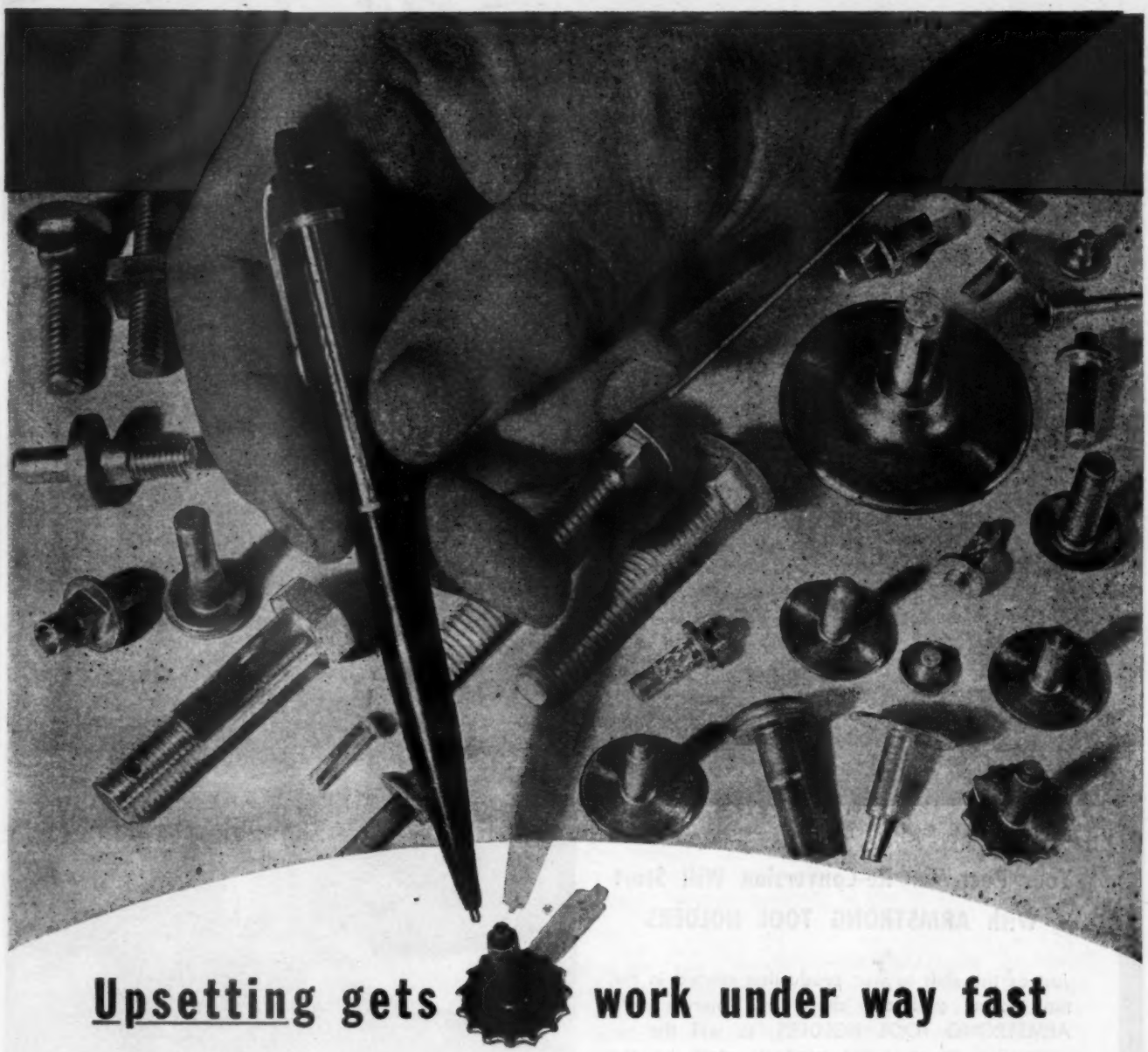


The CLEVELAND HOBBING MACHINE Company

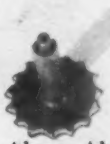
General Offices: 1311 CHARDON ROAD CLEVELAND 17, OHIO

Chicago Office: 624 S. MICHIGAN AVE. CHICAGO 5, ILLINOIS

BUILDERS OF RIGIDHOBBERS AND RIGIDTURNERS



Upsetting gets work under way fast



In two quick steps, this little part is made. The head and the shank with projection are upset from Alcoa Aluminum wire in a rivet header. A blanking operation shapes the head, and the part is ready for heat treating.

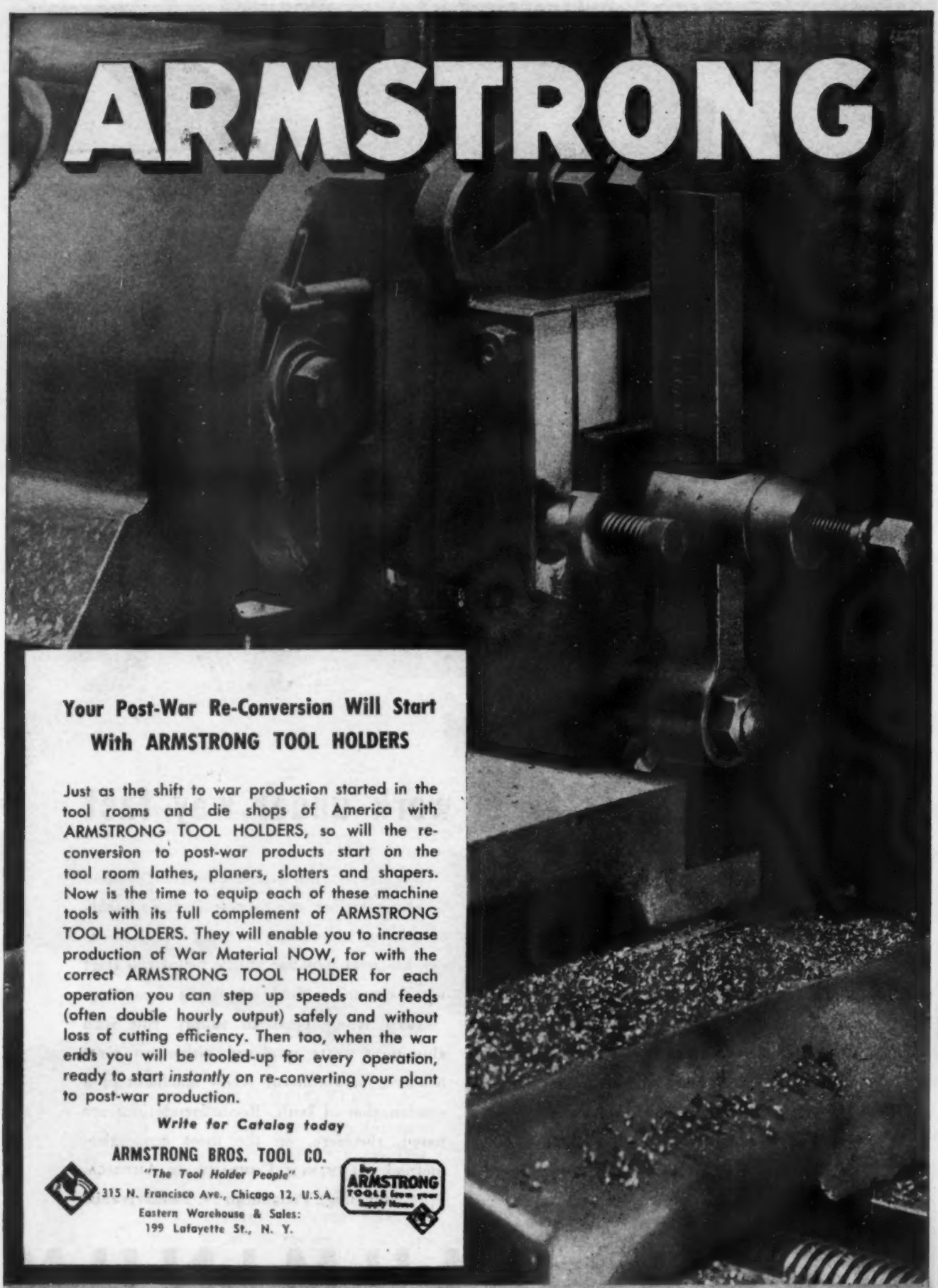
Dimensions can be closely controlled in these heading and blanking operations. Parts, like the carriage bolts you see in the photograph, can be produced with well filled-out square shoulders without the need of expensive milling operations.

Where design and quantities warrant production by upsetting, this process develops sizable economies. In addition to being fast, it saves raw material. You use all the metal you start with, obtaining final shapes by upsetting.

Alcoa is equipped to supply you with aluminum parts produced either on rivet headers, on automatic screw machines or a combination of both. Recommendations are based, therefore, on the most economical method. ALUMINUM COMPANY OF AMERICA, 2107 Gulf Bldg., Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM

ARMSTRONG



Your Post-War Re-Conversion Will Start With ARMSTRONG TOOL HOLDERS

Just as the shift to war production started in the tool rooms and die shops of America with ARMSTRONG TOOL HOLDERS, so will the re-conversion to post-war products start on the tool room lathes, planers, slotters and shapers. Now is the time to equip each of these machine tools with its full complement of ARMSTRONG TOOL HOLDERS. They will enable you to increase production of War Material NOW, for with the correct ARMSTRONG TOOL HOLDER for each operation you can step up speeds and feeds (often double hourly output) safely and without loss of cutting efficiency. Then too, when the war ends you will be tooled-up for every operation, ready to start *instantly* on re-converting your plant to post-war production.

Write for Catalog today

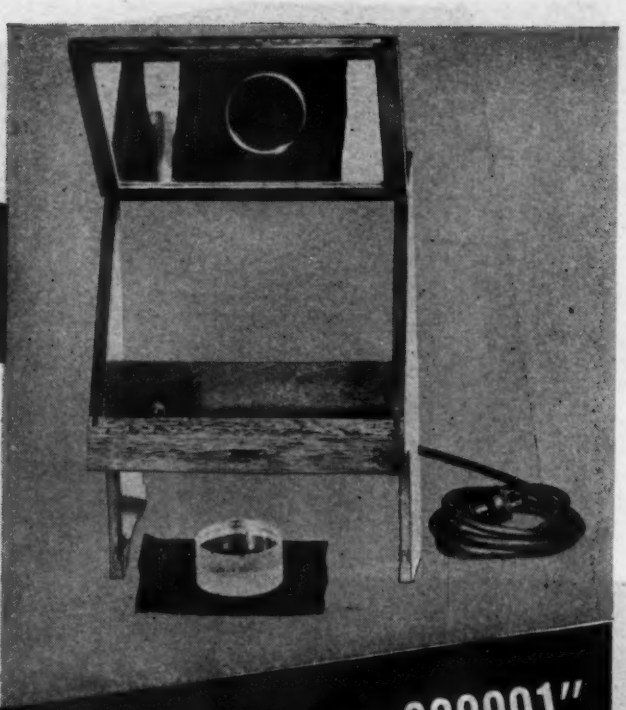
ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
315 N. Francisco Ave., Chicago 12, U.S.A.
Eastern Warehouse & Sales:
199 Lafayette St., N. Y.

Buy ARMSTRONG TOOLS from your Supply House

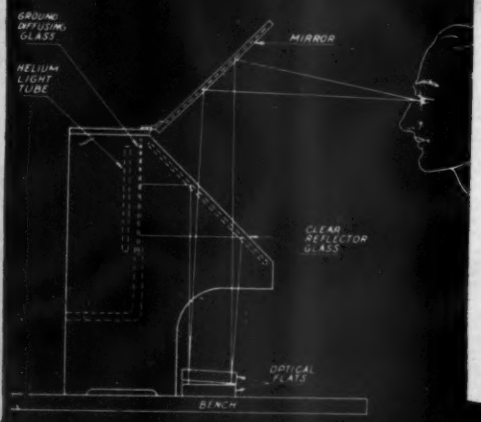
ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

Announcing...

the NEW Van Keuren TYPE L. improved Laboratory MONOCHROMATIC LIGHT



Assuring true light band values, accurate to .000001"

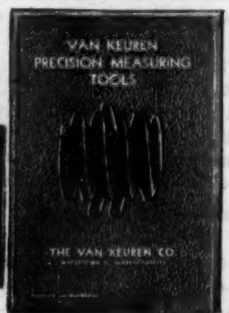


This Type L Monochromatic Light is designed for use in comparing gage blocks for size, and for checking optical flats and ultra precision surfaces, where results must be accurate to one or two millionths of an inch.

The advantages of the Type L Monochromatic Light is that the line of vision is nearly perpendicular to the surface being tested. Therefore, the light wave bands have their correct value of .00000116" per dark band. Where other monochromatic lights show flat surfaces to be slightly concave, the Type L Monochromatic Light gives true results to an accuracy of better than a millionth of an inch. The Type L light is convenient to use. It starts instantaneously and it has a tube life of 2,000 hours.

With the new Van Keuren Improved Monochromatic Light, light wave bands have their correct value of .00000116" per dark band. Further details are available on request.

nearly perp... tical flats. As the ... mirror, this line of vision becom... perpendicular. This distance is limited only ... the width of room in which the light is used.



Van Keuren

25th YEAR

KENNAMETAL *Lathe File Does as Much Work as 150 Mill Cut Files*

...AND PRODUCES A BETTER FINISH!

Comparative service tests continue to prove convincingly that Kennametal lathe files multiply production, improve quality of work, and effect substantial savings in the cost of files used. For example, on the job illustrated above:

A mill cut steel file, employed to remove the sharp edges from the 400 Brinell steel part, wore out on about 100 pieces. A Kennametal file turned out 800 pieces the first day—stayed on the job two weeks—and produced 15,000 pieces. The Kennametal file cut a curling chip—did not scrape or skid—and provided a finish that was almost as smooth as a grinding job!

Kennametal lathe files outlast steel files 50 to 200 times, because their surface is made of the same hard, cemented carbide composition as steel-cutting Kennametal-tipped tools. They permit filing speeds 3 to 10 times those possible with steel files—doing an outstanding job on cast iron and brass at surface speeds around 900 feet per minute, and on high-carbon, high-chromium steels at 800 surface feet per minute. The keen, sturdy teeth of a Kennametal file will make a clean, true cut on steels up to 62 Rockwell C, a hardness that ordinary files cannot touch.

The value of any tool is measured by the quality and quantity of work it produces. The higher original cost of Kennametal lathe files is insignificant compared to the tremendous economies effected through their use. Order one today for test purposes—let it prove its merit in your shop.

Kennametal Lathe Files are now furnished in two sizes—11" or 14" long—and each size is available with either 20 or 30 teeth per inch. The 11" size (F-76—30 teeth/inch; F-77—20 teeth/inch) having a filing surface 4" long x ¾" wide, costs $12.50. The 14" size (F-86—30 teeth/inch; F-87—20 teeth/inch) having a filing surface 6" long x ¾" wide, costs $18.50. All sizes can be shipped promptly.

KENNAMETAL

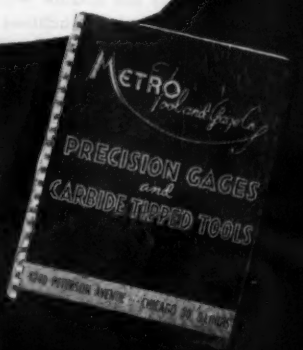
SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc. LATROBE, PA.

TOMORROW AS TODAY

War Production has created for American Industry even higher standards of accuracy and precision than our already high prewar standards. These higher standards will of course carry over into postwar industry. Then, as now, industry will turn to Metro for Standard Gages and Carbide Tipped Tools or ask Metro to design special items for special needs.

ARMY (E) NAVY



Metro Standard Gages and Carbide Tipped Tools are available for immediate delivery through your METRO distributor

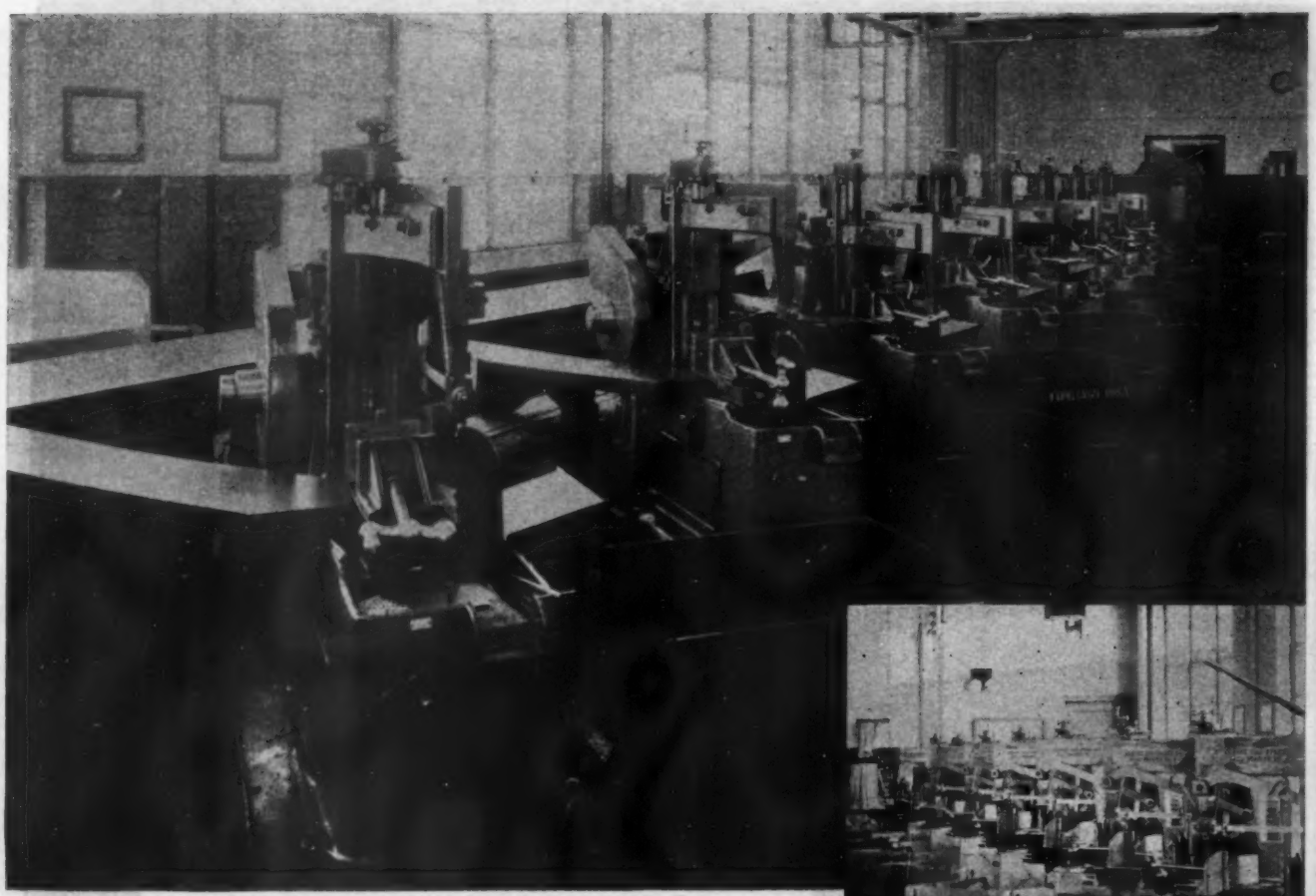
Write Today for New Metro Catalog No. 102

METRO

TOOL AND GAGE CO.

4240 Peterson Avenue

Chicago 30, Illinois

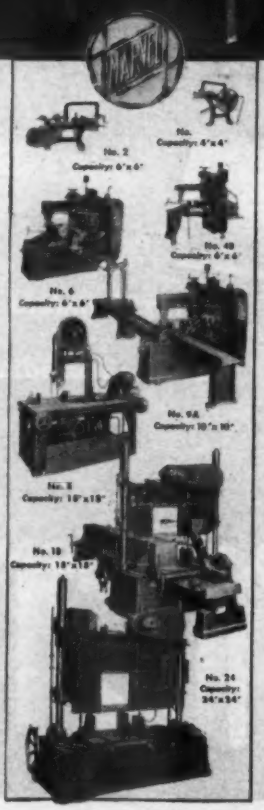


Where Speed Counts *Most!*

Increased steel production and more rigid inspection during the war has made it necessary for metallurgical laboratories to require hack saw machinery for specimen cutting of a wide variety of metals and alloys of almost any shape or size — in any condition of hardness.

The photos shown here illustrate how one large steel mill in the middle west has installed a battery of Marvel Hack Sawing Machines to crop and cut-off slices for metallurgical tests of large billets of tough alloy steels. This company, along with many other steel companies, has found that the Marvel Machine is the only one capable of cutting the hardest alloys fast and economically. The Marvel is the most universal cutting-off machine, built for heavy duty, continuous operation.

Marvel Saws increase production by rapidly, accurately and economically cutting-off the toughest steels in cross sections up to 24" x 24". If you have metal sawing problems, Marvel Sawing engineers are available to discuss and analyze your cut-off work—to recommend methods and equipment.



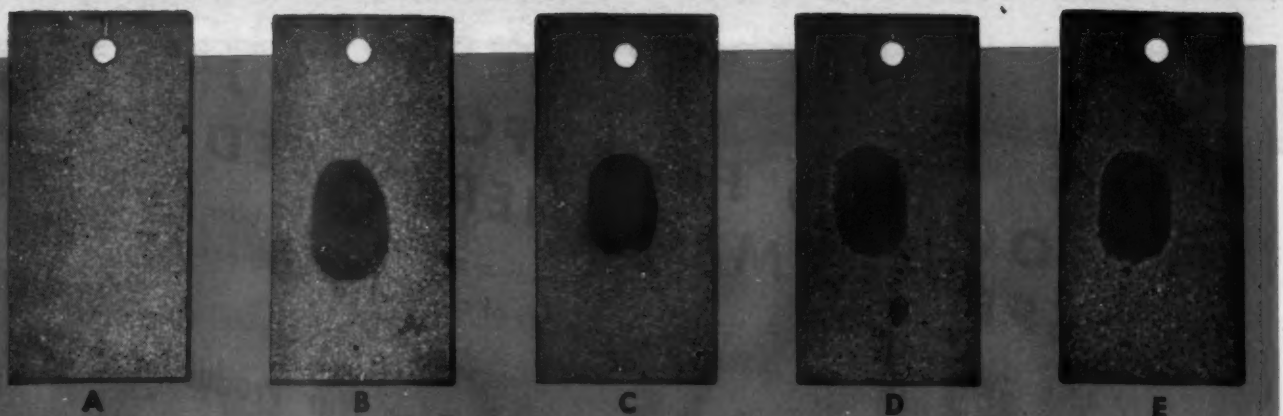
ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 W. BLOOMINGDALE AVE. CHICAGO 39, U.S.A.

Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.

MARVEL SAWS



FINGERPRINTS *Neutralized*

by new *Aqueous* type Rust Preventive

QUAKER FERROCOTE #110

Frankly, we *could* have "faked" the illustrations you see here . . . but we could not have demonstrated more perfectly the ability of FERROCOTE #110 to dissolve fingerprint residues and neutralize their corrosive effects than do these genuine, *unretouched* photos.

Sweaty fingers were applied to each of the steel test panels shown. Half an hour later, panels A, B, C and D were each dipped in a different type rust preventive, as follows: A—FERROCOTE #110 (mixed 1-to-3 with water), B & C—two leading solvent-type rust preventives (diluted 1-to-3 with a Stoddard solvent), D—a light slushing oil. Panel E was left untreated for comparison. All 5 panels were then placed in a controlled humidity cabinet for the same length of time. On removal, panel A showed no trace of corrosion, whereas all the others had developed definite "cancers" of rust.

In addition to its unlimited capacity for dissolving fingerprint residues, FERROCOTE #110 provides rust protection equal to that of the best solvent-type FERROCOTES. Other characteristics of FERROCOTE #110 are:

- **Although applied as an aqueous emulsion, it becomes water-insoluble upon drying, but remains readily cleanable in either soap solutions or solvents.**
- **Is odorless, non-combustible and non-injurious to the skin.**
- **Readily dispersible in all proportions of tap water.**
- **Emulsion stability excellent, even in hard water.**
- **An entirely new organic-type corrosion preventive; contains no paraffin wax.**
- **Has excellent wetting properties, even on dirty or oily surfaces.**
- **Dries to provide a thin, colorless, transparent and long-lasting protective film.**
- **Non-corrosive to lead or copper (Spec. AN-C-52 Test).**

QUAKER CHEMICAL PRODUCTS CORP.

CONSHOHOCKEN, PA.

Other Plants in CHICAGO and DETROIT Warehouse Stocks in Principal Industrial Centers

For details of the MICROGRIMD PROCESS fill in below, tear out and mail

A Progressive Organization of Research and Process Engineers and Manufacturing Chemists

Name_____ **Position**_____

•••PLEASE PRINT COMPANY NAME AND ADDRESS IN MARGIN BELOW•••

LOOK TO FENN FOR YOUR SPECIAL MACHINERY NEEDS

3 Generations of Fenns have specialized in building machinery. They have the designing and engineering skill backed by years of craftsmanship and experience.

REDESIGNING MACHINERY for Profitable Post War Production

If you are thinking of redesigning old machines or building new ones, it is time to plan NOW.

Fenn Aircraft
BUILT PARTS FOR FAMOUS PLANES

Today Fenn is wholly engaged in war production. Thousands of precision parts and subassemblies flow from Fenn Plants into the construction of such famous planes as the Navy Corsair. Other Fenn parts and assemblies are made for ships, tanks, guns and vital war equipment.

FENN Plants - Strategically located for Efficient Service

Fenn plants, located at Hartford and New Britain, will once again build special machinery at the close of the war. The men with the skill and experience to solve machine design and development problems, will be ready to work with you. Planning, blueprinting and engineering can be done now. Your inquiries involve no obligation.

Experienced Designers and Machine Builders With A Long-Time Reputation for Precision Workmanship. We invite your inquiries.

THE FENN MANUFACTURING COMPANY
HARTFORD • CONNECTICUT

MAINE STEEL, INC. *Reports . . .*

"Greatest Time and Money Saver in Die-sinking Machinery in 25 Years!"

"You may remember that about a year ago you sold us a Rotary Head Die-Sinking Machine. We feel that it is time that we told you what we think of it.

The Rotary Head principle has saved us more time and money than any other improvement in Die-Sinking Machinery since Cherrying Attachments were invented more than twenty-five (25) years ago.

The principal reason is that we can sink four (4) impressions complete without moving the work on the table.

This saves three (3) setups out of four (4) when compared to a Rotary Table Machine.

This saving would of course be increased where more than four (4) impressions are needed.

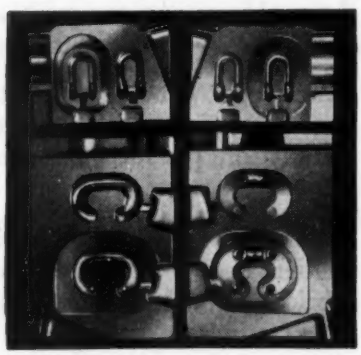
Besides this — the various movements built into this Rotary Head enable us to sink our dies without first laying them out on the Die Blocks.

The machine does its own layout work.

And after a year's experience we can say that these two features have averaged to save us over 30% of our die-sinking time.

Yours very truly,

MAINE STEEL, INC.
A. A. Rines
Foreman—Die Sinking Dept. "



This is typical of the forging dies produced by Maine Steel, Inc. The Milwaukee Rotary Head Miller has saved this firm over 30% in die-sinking time on dies of this type.

Kearney & Trecker's Rotary Head Miller is regarded by the majority of users as the most versatile machine ever designed for die and mold work. Direct — fast — accurate — it reduces initial job preparation and set-up time to the minimum — saves operator's time and assures rapid production of dies and molds. Write for Bulletin No. 1002C for full information on this unusual machine tool.

Rotary Head Milling Machine
•
Autometric Jig Borers
•
Center Scope

Kearney & Trecker
Products
CORPORATION
Milwaukee, Wisconsin
Subsidiary of Kearney & Trecker Corporation

Milwaukee Face Mill Grinder
•
Milwaukee Midgetmill
•
Milwaukee Speedmill

New Ampac A-C WELDER Makes Big Hit!

SUPERINTENDENTS LIKE AMPAC BECAUSE:

- They get a wider operating range with the Allis-Chalmers Ampac "400"—50 to 500 amps. That means they can schedule a greater variety of welding output on both *thick* and *thin* metals without changing machines.
- They don't have to provide a 3-phase line when they install Ampac — as they do with d-c welders. Ampac uses *any* standard a-c voltage: 220-440 and 208 v, 60 cycle.
- Ampac's lower initial investment makes sense to them. Its simplified construction and quick installation produce a big saving over comparable d-c units.
- They like Ampac's low maintenance. Ampac welders need only a 15 minute inspection and lubrication twice a year. Less time *out* for service—more time *in* for production.
- Ampac's simplicity means longer life, more dependable service. There are only three moving parts to wear.
- Power bills are reduced by as much as 50% after switching from d-c welders to Ampac.

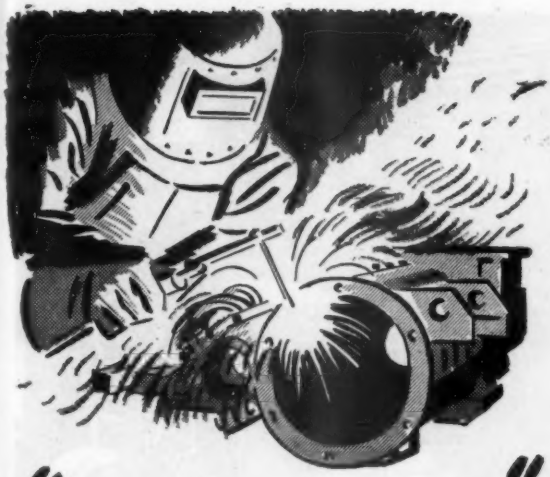
WELDERS LIKE AMPAC BECAUSE:

- They don't have to fight arc blow . . . there's *none* with an Ampac a-c welder!
- They do better work — get sound, uniform welds with Ampac's steady power flow. That also means they can weld in deepest corners without reducing speed.
- They like the easy, quick way they can adjust Ampac power. Seven turns of the control wheel covers the entire welding range.
- They find Ampac easier to move over rough floors. Wheels available are *oversize.*
- Any accidental damage to Ampac's case does *not* affect the structure of electrical parts within. Case serves only as a protective shell.
- They know they can stay on a job until it's done . . . because Ampac's oversize, extra-rugged parts can take it. The new Ampac was designed in wartime for 24-hour-a-day war production.
- Get the full story on this brilliant new welder from our nearby Ampac dealer or A-C District Office. Allis-Chalmers, Milwaukee 1, Wis.

♪ *Tune in the Boston Symphony, Blue Network, every Saturday at 8:30 pm, EWT.*

ALLIS-CHALMERS AMPAC "400"

A 1702



With new traction motors almost impossible to get, many over-age motors must be kept on the job. Here's one way traction companies are doing it.

"Worn-out" Traction Motors

GO BACK GOOD AS NEW

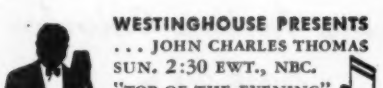
Passing over rail joints day after day gives traction motors a severe pounding. Wear is bound to develop in housings, tapped holes and axle bearing parts.

In normal times, badly worn motor frames would be discarded. But not today. A service developed by Westinghouse *Manufacturing and Repair** Plants, conveniently located in your district, is keeping them on the job.

Worn frames are delivered to Westinghouse M & R Plants. By a special welding process, tapped holes, housings and axle bearing parts are built up, then redrilled and remachined. The frames are returned as good as new, ready for many more years of service.

Many large traction companies use this Westinghouse M & R service . . . another example of the ability of this factory-trained organization to handle electrical repair problems economically and efficiently.

J-90518



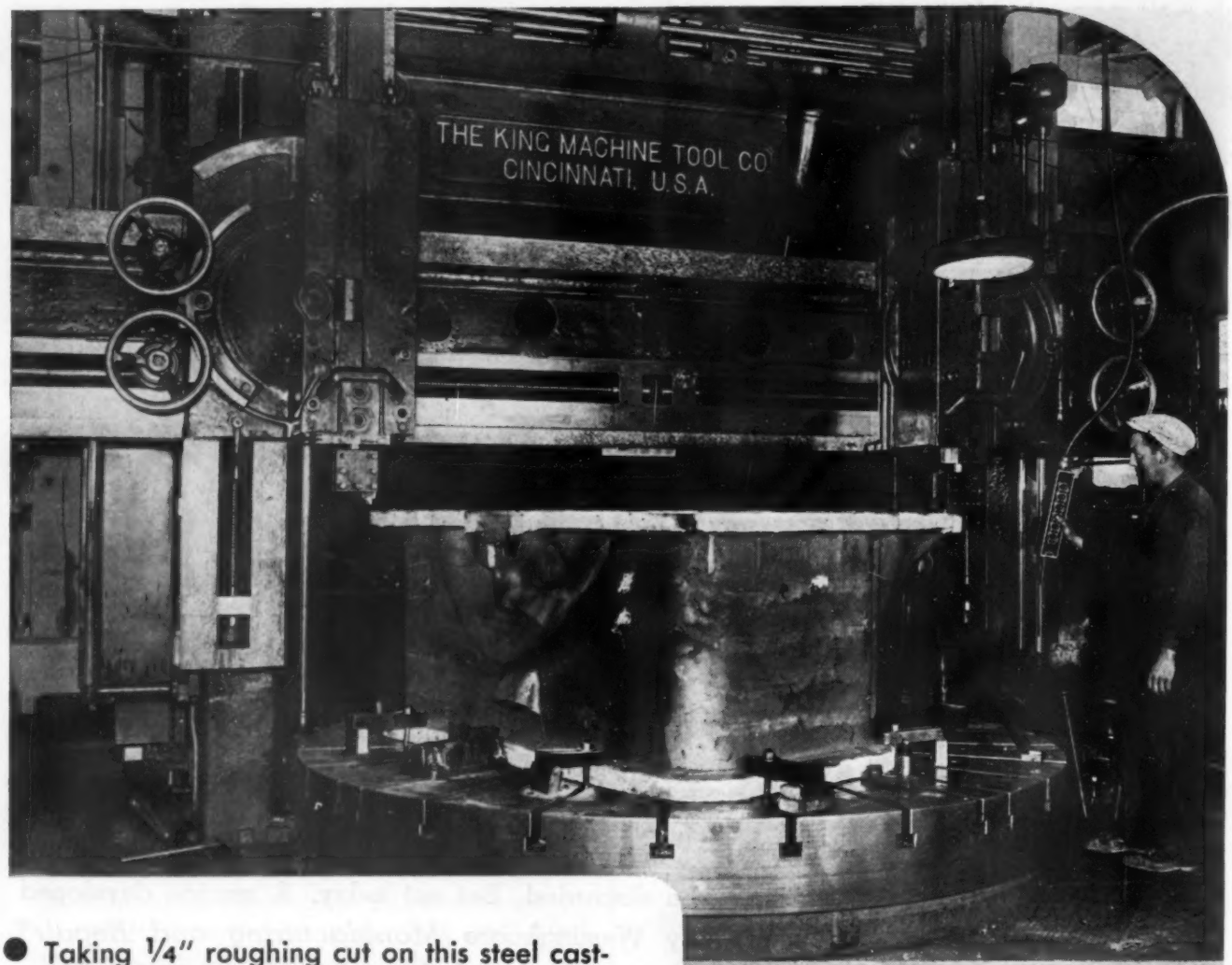
WESTINGHOUSE PRESENTS
. . . JOHN CHARLES THOMAS
SUN. 2:30 EWT., NBC.
"TOP OF THE EVENING"
MON. WED. FRI. 10:15 EWT., BLUE NET.

When vital electrical equipment needs repair . . . phone the nearest office of Westinghouse Electric and Manufacturing Company for

Westinghouse

COMPLETE REPAIR SERVICE

*33 M & R PLANTS • • ONE NEAR YOU



● Taking 1/4" roughing cut on this steel casting is part of the day's work for this King Vertical Boring and Turning Machine. The operation is a facing cut on a Turbine cylinder base. The job weighs 4200 lbs.

Capacity for large jobs — power and rigidity to take heavy roughing cuts are inherent construction features of this King Boring Machine. If you have a tough boring — turning or facing job, you can count on a King Vertical Boring Machine to do it better — in less time and at lower cost.

The job shown is typical of the wide variety of jobs being handled on King Boring Mills throughout industry.

Facing Turbine Cylinder Base on a

KING

VERTICAL BORING AND TURNING MACHINE

★

***KING BUILDS** Vertical Boring and Turning Machines exclusively in single column types from 30" to 42"—double column types up to 12 feet.*

THE KING MACHINE TOOL COMPANY
CINCINNATI 32, OHIO

BUILDERS OF VERTICAL BORING AND TURNING MACHINES EXCLUSIVELY

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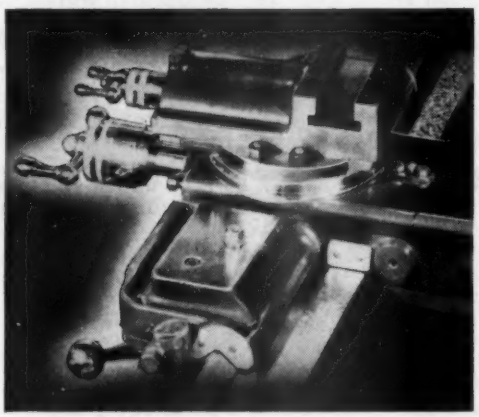
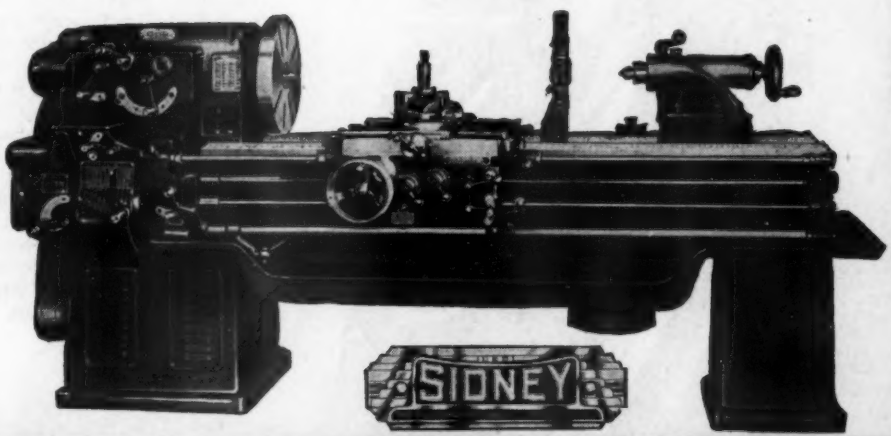
Sidney Lathes



GET FLEXIBILITY WITH COMPOUND REST

The cross feed and compound screws are furnished with adjustable nuts and tapered gibs to compensate for backlash and wear . . . both are equipped with large micrometer dials and provided with ball thrust bearings . . . A micrometer stop on the cross feed provides an adjustable depth stop for turning or threading—and for internal and external thread chasing . . . The swivel of the compound rest is graduated 90° each way from center and is securely held in place by four bolts . . . Note center gib provided in addition to front and rear gibs under V ways . . . Bulletins on each model available.



The SIDNEY MACHINE TOOL Company

Builders of Precision Machinery

SIDNEY ESTABLISHED 1904 OHIO

Close Limits and Fine Finish -

FOR EFFICIENT PRODUCTION

Close limits and a fine finish are essential for efficient production on many important metal working operations. Maximum output at minimum cost can be attained only when the methods and machines are such that close tolerances and the best possible finish can be maintained on piece after piece, indefinitely.

It is on this type of work—exacting toolroom jobs or production operations that call for toolroom accuracy—that the high precision and dependable performance of South Bend Lathes pay real dividends. Their smooth operation through a wide range of spindle speeds produces surprisingly fine finishes. In fact, when South Bend Lathes are installed, subsequent finishing operations can often be eliminated.

Today South Bend Lathes are better in every way. Our entire plant is devoted to lathe production—we manufacture no other products. There has been no lowering of standards because of war-time restrictions or shortages and the use of substitute materials is negligible, limited to non-essential parts such as name plates, paint, etc. Improvements have been accelerated to meet war production needs.

South Bend Engine Lathes and Toolroom Lathes are made in five sizes: 9″, 10″, 13″, 14½″, and 16″ swing. Precision Turret Lathes are available in two sizes: Series 900 having 9″ swing with ½″ collet capacity, and Series 1000 having 10″ swing with 1″ collet capacity. Write for Catalog No. 100-C.

BUY WAR BONDS NOW . . . SAVE FOR LATHES

SOUTH BEND LATHE WORKS

LATHE BUILDERS FOR 37 YEARS • SOUTH BEND 22, INDIANA

POST-WAR PRIORITY PLAN

To those who cannot qualify for a war-time priority, South Bend Lathe Works offers a practical Post-War Priority Plan. You can place your order now for any South Bend Lathe. No deposit or down payment is required. We ask only that the order be placed in good faith. When civilian production is resumed, orders will be filled in the sequence established by the numbers of the Post-War Priority Certificates. Should conditions necessitate, the order may be cancelled at any time. Write now for details of this plan.

LEFT AND RIGHT from a single master

Here's a war-inspired Keller improvement of far-reaching significance for further war production and, soon we hope, for faster peacetime tooling.

With synchronous control reversal as illustrated, two Kellers can now produce left- and right-hand dies of perfect symmetry in a single operation. As the right-hand "sending" machine cuts a right-hand die guided by the master (see upper right corner of photograph), it sends an identical but reversed pattern to the left-hand "receiving" Keller machine.

Result — two dies from a single master together with symmetry impossible to achieve with separate handmade left- and right-hand masters as formerly required. Interpretation — faster tooling for all automotive and other parts, such as fenders, doors and side panels, that require symmetrical right- and left-hand parts — plus worth-while cost reduction.

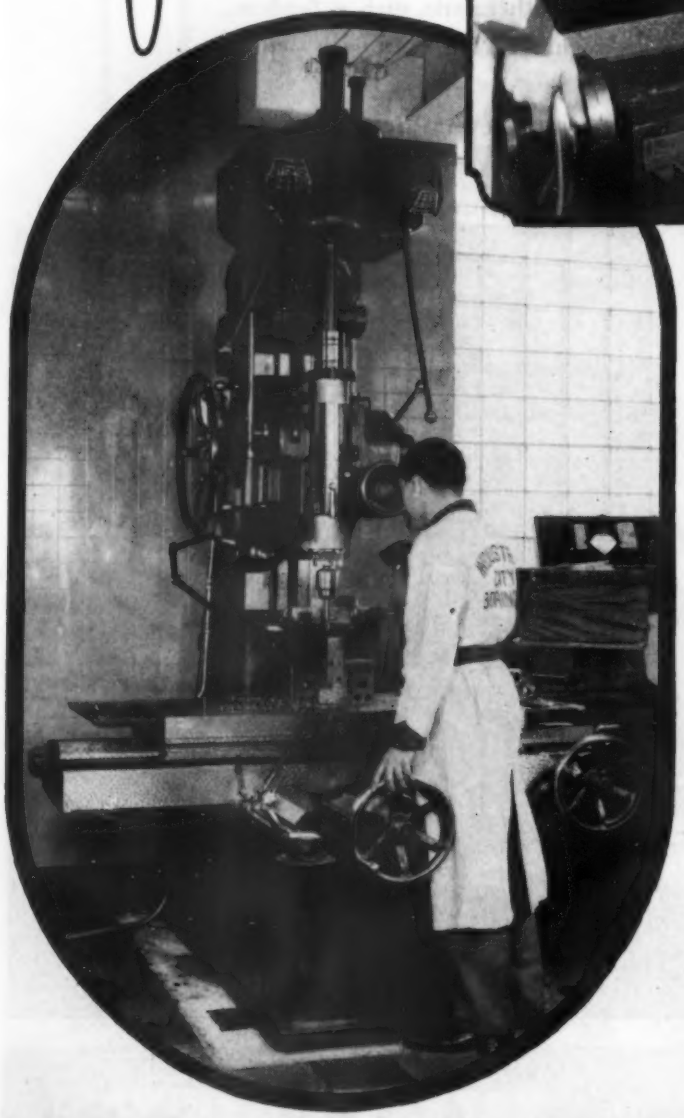
Complete information regarding synchronous control reversal for right to left reproduction for P&W Keller machines is available upon request.

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD 1, CONNECTICUT

Precision at work



FOSDICK
JIG BORER

● With tolerances of plus or minus .0002 inch the operator is making certain that everything is perfect before starting to bore three 1⅛" holes on this Fosdick Jig Borer.

The machine is located at Craftsman Tool & Die Company. The job is a welded construction fixture for prominent airplane company.

When it comes to precision boring drilling — reaming and similar operations the Fosdick Jig Borer has the rigidity to hold close tolerances — simplicity of operation to meet production demands — and adaptability to cover a wide range of diversified operations.

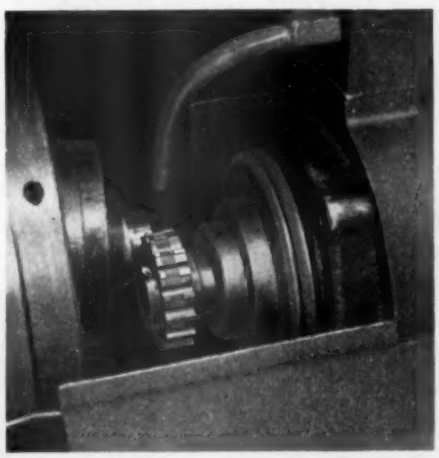
For complete information on this moderately priced precision machine ask for Fosdick Jig Borer bulletin J.B.A.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI 23, ··· OHIO

ANOTHER EXAMPLE OF

BARBER-COLMAN

CUTTER PERFORMANCE



B-C THREAD MILL COMPLETES 1 PIECE EVERY 54 SECONDS

Barber-Colman Ground Thread Milling Cutters, held to class III limits, are used for threading the end of this aluminum valve tappet guide for well-known aircraft engines. Cutting at 550 r.p.m., they are producing 520 pieces every 8 hours. Complete floor-to-floor time is 54 seconds per piece. The cutters are sharpened about once a week, averaging 2500 pieces per grind, but some have run as high as 4800 pieces per sharpening. The piece is held in a special air-cylinder-operated chuck. *Where accuracy, finish, and high production are required—use Barber-Colman Cutters.*

Pictures above show the cutter, the piece, and the set-up. The set-up uses a special chuck holding the piece at an angle so the threads are in the proper position with respect to the cutter.

Buy War Bonds

BARBER B-C COLMAN PRODUCTS

HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, MILLING CUTTERS, SPECIAL TOOLS

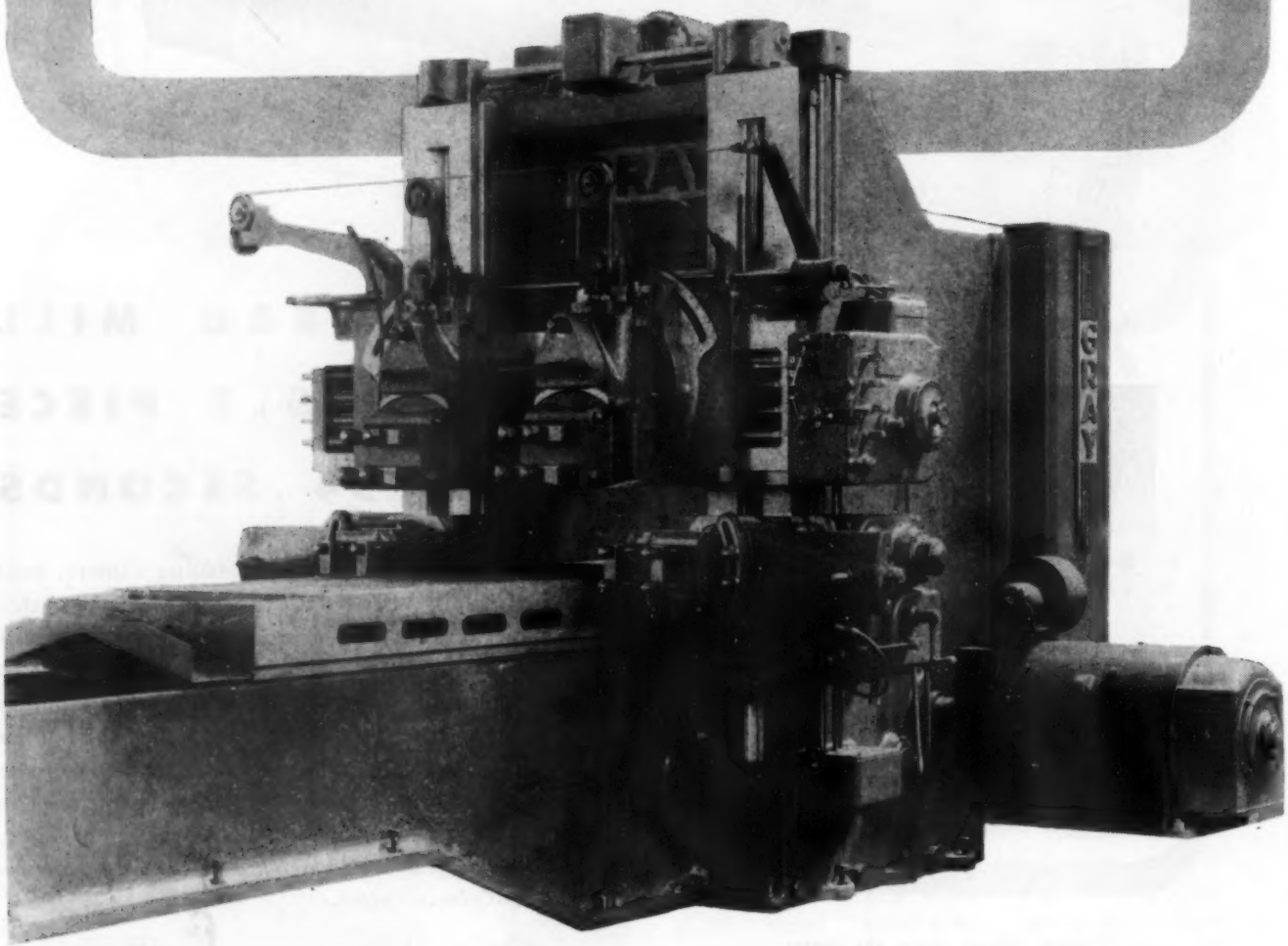
Barber-Colman Company

GENERAL OFFICES AND PLANT • 111 LOOMIS STREET • ROCKFORD, ILLINOIS, U. S. A.

Designed for the Job . . .

GRAY DIE-BLOCK PLANERS

● The demand for hard — tough die blocks has increased enormously to meet our war requirements. The Gray Die-Block Planer was designed for this type of work. It will face, side plane and shank die blocks in the shortest possible time. All heads are swivel type, are equipped with tool lifters and have power feed and rapid traverse. It is powered by a 50 or 75 h.p. motor.



GRAY

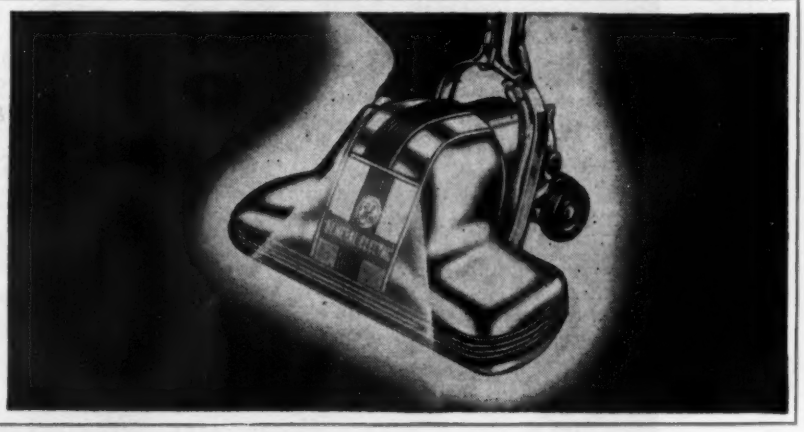
THE G. A. GRAY COMPANY
Cincinnati 7 Ohio, U. S. A.

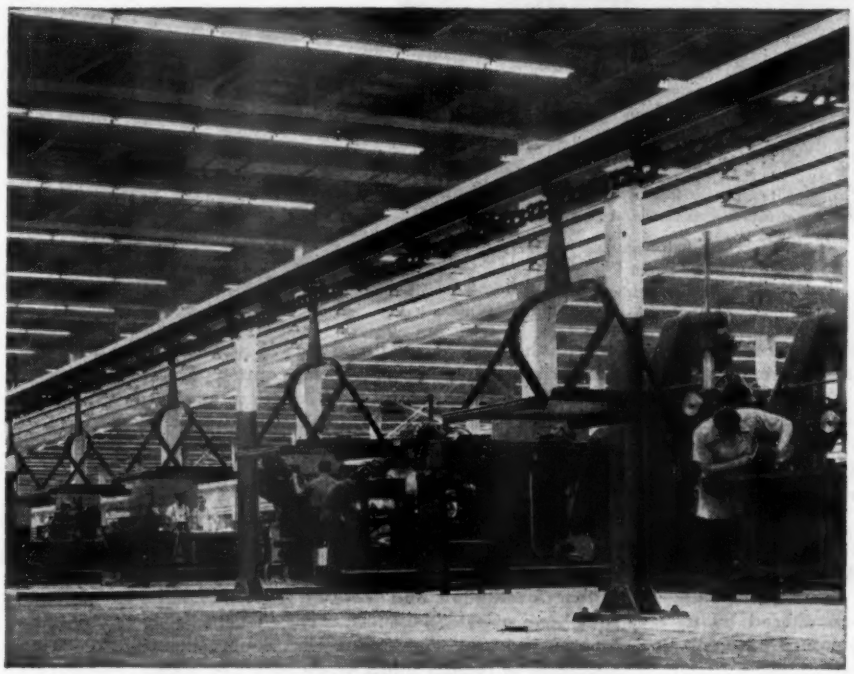
THE GRAY LINE — Double Housing and Openside Planers, Switch Planers, Die Block Planers, Double-Housing and Openside Milling Planers, Planer Type Milling Machines, Horizontal Boring Machines.

WE'D LIKE TO HELP YOU BRING UP YOUR BABY!

1 Got a postwar baby on the drafting boards? Want to add to its sales appeal? Want to turn it out faster and at lower cost? General Electric Lamp Engineers may be able to help you do *both*. Why not call them without delay?

2 Make your product more attractive. Whether your postwar baby is an airplane or a vacuum cleaner (or any one of a thousand other products) you can make it more attractive and more useful by building into it the right G-E Lamp. It may be a tiny lamp for quick visual indication on an appliance . . . or a powerful landing lamp for an airplane. Whatever it is, G-E Lamp Engineers will be glad to help you get what you need.*





3 Produce it more efficiently. Hundreds of wartime case histories demonstrate how better lighting speeds production, cuts costs and guards quality . . . significant advantages in meeting competition. Plan your lighting as an integral part of your postwar production lines! Experienced G-E Lamp Engineers are at your service.* Just write or phone your nearest G-E Lamp Office.

*Subject to prior claims of wartime assignments.

"TO MAKE G-E LAMPS **STAY BRIGHTER LONGER**"

THE CONSTANT AIM OF G-E LAMP RESEARCH

KEEP BUYING WAR BONDS—KEEP THE WAR BONDS YOU BUY

G-E MAZDA LAMPS

GENERAL ELECTRIC

Hear the General Electric radio programs: "The G-E All-Girl Orchestra", Sunday 10 p.m. EWT, NBC; "The World Today" news, every weekday 6:45 p.m. EWT, CBS.

LET'S RING IT AGAIN!

Every Sterling Grinding Wheel we make is dedicated to limitless progress in a free, unshackled America.

Someone has said that liberty never seems so important as when it is far away. On lonely, distant battlefronts, our men talk of home. They remember their country as they left it and the memory is good. But, they cannot forget those who would change our established order of doing things . . . who still seem to feel the way to advance individual initiative is to strangle it with planned economy and unnecessary regulation.

No serviceman expects his country to be the same as he left it. He expects progress! He has a right to assume that any changes made at home will be for the better—that he can return to a life that has not been altered by a system of dubious value, promising only future hardship and depression.

The American people have a most important duty to perform for the boys across the seas. We have stood up under many kinds of shortages, but we cannot permit a priority to exist on good, old-fashioned American opportunity! If a returning veteran wants to start in business for himself, he should not be repelled by fear of excessive taxation. He should not have to ask anyone where or how long he can work. If he needs help, it should be given him without paternalistic pats on the head by anyone. He wants to enjoy the freedom for which he fought!

The democratic principles of our forefathers were set fourth in the Constitution and the Declaration of Independence. They have withstood the test. It is for these principles young America goes to war, and Young America expects those principles to remain intact while they are gone.

The Liberty Bell—let's ring it again!

it started something!

When this train stopped, way back in '69, it started a train of events that vitally affects our lives today, and is helping to shape the world of tomorrow.

The train was the Steubenville Accommodation, first in the world to be equipped with the new Westinghouse Air Brakes. It was rolling at 30 miles per hour when the engineer saw, directly ahead, a dray stalled on a crossing.

Then history was made. The engineer moved the brake lever to emergency. Brakes squealed, passengers sprawled on the floor, and the train ground to a stop, inches away from the dray. This dramatic demonstration won immediate acceptance of the new brake.

Without the air brake, today's transportation miracles would be impossible. Trains can *go* faster . . . because they can be stopped faster. But the contribution of air control merely begins there. It is governing the entire cycle of engine maneuvering on fighting craft. It is controlling the handling of materials, the operation of well drilling rigs, road building machinery, and doing dozens of other jobs . . . and the surface of its possibilities has not been scratched.

In any thinking about improvements in products or production, give W-A-B Controls a place in your planning.

Westinghouse Air Brake Company

INDUSTRIAL DIVISION

General Offices: Wilmerding, Pa.

75 Years of Pioneering

1869 1944

W·A·B

Pneumatic · Pneumatic Electric · Pneumatic Hydraulic

remote control systems

Cincinnati Planer

ACCURACY and POWER SPEEDS PRODUCTION

The illustration shows some of the 16 Cincinnati Hypro Planers at the Warren City Manufacturing Co., Warren, Ohio. They include both openside and double housing types and were all installed in the past two years. They vary in capacity from 36" to 120".

The Warren City Manufacturing Co. is doing a splendid job for the U. S. Navy and other services in the war effort. Cincinnati Hypro Machine Tools are used exclusively in all operations requiring this type of equipment.

Maximum production requiring extreme accuracy is demanded by the Armed Forces. Cincinnati Hypro Planers provide speed, extreme rigidity and numerous other exclusive features described in our Catalogues 110 for Openside and 136 for Double Housing Planers.

ARMY E NAVY

Send in your blue prints for suggested methods and time analysis.

THE CINCINNATI PLANER COMPANY

Planers... Vertical Boring Mills... Planer Type Millers

CINCINNATI . OHIO . U.S.A.

BETWEEN THE FALL OF FRANCE AND LAST 4th OF July AMERICA PRODUCED

310,000 military planes
5,000,000 tons of naval vessels
35,000 landing craft
77,000 tanks
1,600,000 trucks
35,000,000 tons of merchant shipping

Praise the Lord and pass ANOTHER miracle

To pass the miracle of production that took place between the Fritz-blitz which blew Poland to bits and the Eisenhower-invasion hour, required four and three-fourths years of priceless time.

"Vulcan Tool", which did its all-out bit in that great miracle, is ready to start designing and building the tools for your victory of peace.

You can expect Vulcan to work miracles again in line with its long proven record of imaginative designing and precision production. But even minor miracles take some time. There is no longer any time to delay consultation about the design of tools you're going to need.

The VULCAN TOOL Co.

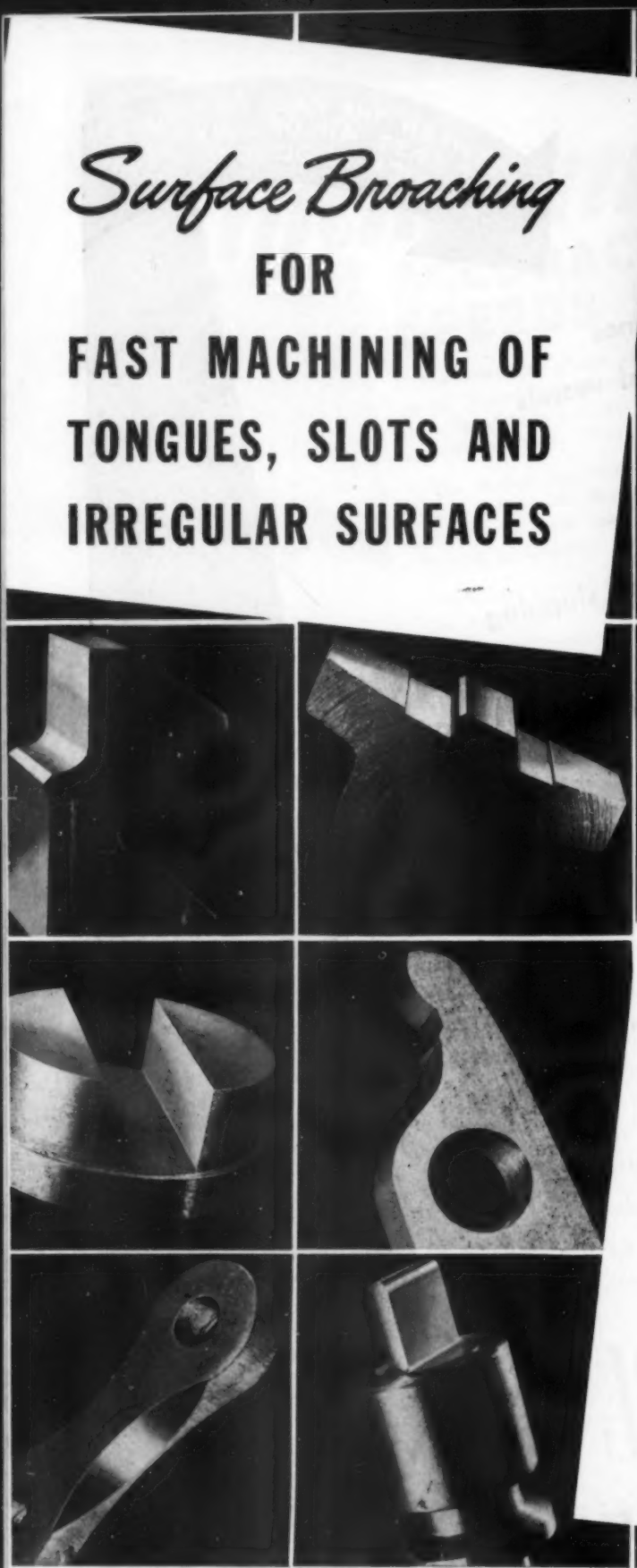
213 NORTH BECKEL STREET DAYTON 3 OHIO

Write for brochure illustrated

Surface Broaching

FOR

FAST MACHINING OF TONGUES, SLOTS AND IRREGULAR SURFACES



★ A great many parts similar to these illustrations are being surface broached more economically than was possible with previous machining methods. Fine finish to close tolerances is maintained and production up to 2000 pieces per hour is obtained on many of them. Send blueprints and production requirements for an analysis of your machining problem. We will be glad to give you the benefit of our long experience in the development of surface broaching.

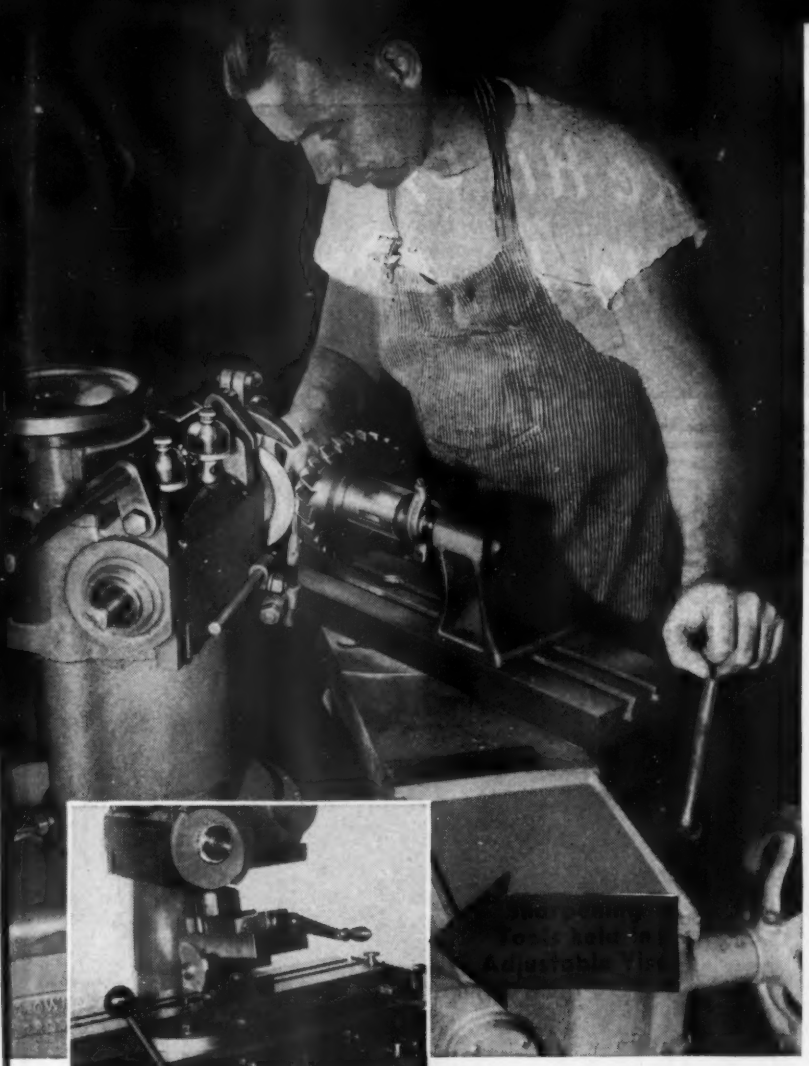
THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

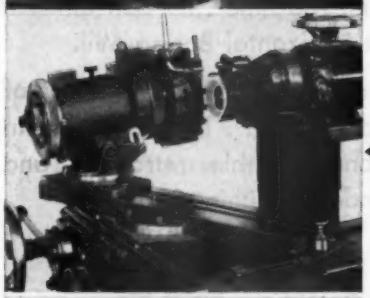
Detroit Office: General Motors Building

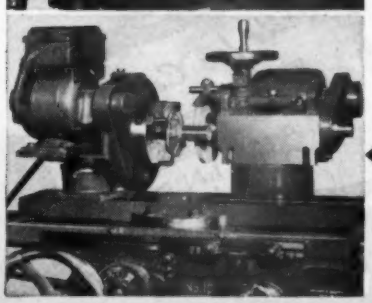
MOVE UP THE SCHEDULE ☆ WIN THE WAR QUICKER

Footburt Patented Tooth Form

FOOTBURT *Surface Broaching*







PRECISION SHARPEN

YOUR CUTTING TOOLS ON No 10

— a dependable machine **built-for-the-job**, developed from years of experience in making and using a multitude of cutting tools of all kinds.

No. 10 CUTTER AND TOOL GRINDING MACHINE not only efficiently sharpens cutters, but much other work can be accommodated by using the versatile regular equipment or the many attachments, some of which are shown at the left.

PROMPT DELIVERY on No. 10 enables you to install the machine now — so as to get immediate advantage of its usefulness.

B·S BROWN & SHARPE MFG. CO. PROVIDENCE 1, R. I., U. S. A.

BROWN & SHARPE

He Never Has to Take His Eyes Off the Cutter and Work

DEVLIEG JIGMIL

Spindle start, stop and reverse—

Power vertical feed and rapid traverse movement—

Power horizontal feed and rapid traverse movement—

Power automatic table retraction and repositioning—

Power feed and rapid traverse to bar movement—

are all carried in a master switch on the spindle head — at the operator's finger tips.

Thus, the operator of the DeVlieg Jigmil can fix his vision on the cutter and work—never has to look at controls during operation.

The Jigmil is what a machine tool should be—a powerful and accurate extension of the operator's hand. The value in precision boring and milling is apparent.

It's a NEW Type Machine

Spacing Accuracy of a Jig Borer . . . Performance Qualities of a Milling Machine . . . Convenience and Flexibility of a Horizontal Boring Mill.

New speed of operation . . . New standards of excellence of bored holes . . . New accuracy in milling . . . Automatic table retraction and repositioning dependable within .0002".

Many machines show 75% greater average daily productivity.

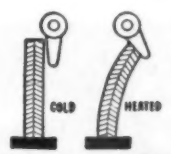
Write for Circular

DEVLIEG MACHINE TOOLS

DE VLIEG MACHINE COMPANY

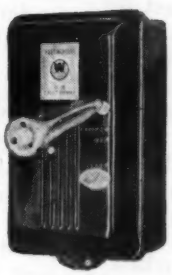
450 FAIR AVENUE, FERNDALE 20, (DETROIT), MICHIGAN

Wild arcs tamed *Quick!*



CALLING THE TRICK is the job of this Westinghouse Bi-metal Element. Two metals which react differently to heat are bonded together. Threatening overloads cause the Bi-metal to bend, tripping the interrupting mechanism and opening the circuit—*before* any damage is done.

TAMING THE ARC is the job of the "De-ion" arc quencher. It consists of parallel metal plates in the form of a grid. The arc is drawn into the quenching chamber . . . divided into segments . . . smothered between the plates—in the space of a half cycle.



When current's on the rampage, a circuit breaker has to function *fast* and *sure*—every time!

Westinghouse "De-ion" Circuit Breakers are built for just such hair-trigger protective action. They pass harmless overloads without interruption, but let danger threaten, and quicker than a blink of the eye—the circuit's opened . . . the arc is quenched. Burns and pits are minimized; contacts stay cleaner, last longer.

Once the disturbance is cleared, service is instantly restored by a flip of the indicating handle. No waiting—no repairs—no parts to replace.

Protect equipment and circuits with Westinghouse "De-ion" Circuit Breakers. Ratings up to 600 amperes; enclosures for nearly every type of service. Call your Westinghouse Representative today. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N.

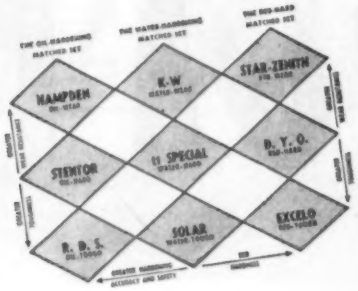
J-21298

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

"DE-ION" CIRCUIT BREAKERS

How One Plant Solved the



Lower Unit Costs and Increased Output Result from Carpenter Matched Tool Steels

A lot depends on the selection of the right tool steel. Hardening failures, premature service failures, too frequent regrinds—very often can be traced to the choice of the wrong steel.

A prominent metal parts manufacturer was having his problems with tool steel selection. How he solved these problems with Carpenter Matched Tool Steels is shown by the examples on the opposite page. The simplified method of selection made it easy to handle successfully each job as it came up.

The nine Carpenter Matched Tool Steels also make possible lower unit costs and increased output because the *proper* type of tool steel can be selected for *each* job. Guesswork is eliminated because the man who selects the steel knows what he is doing and why.

If a certain grade of steel fails to meet the requirements of a tool, the tool maker knows exactly which steel to select in order to correct the trouble. In this manner tool-caused production troubles are held to a minimum, and increased output and lowered unit costs are the natural result.

The examples shown are typical of the manner in which hundreds of metal-working plants have discovered the benefits of Carpenter Matched Tool Steels. Thorough familiarity with the method of selection by regular use will enable any tool room to enjoy the same money-saving advantages.

If you want to find out how Matched Tool Steels can work in your plant, start with a copy of the Carpenter Matched Tool Steel Manual which gives full details. Free to tool steel users in the U. S. A. Write on your company letterhead giving title or position.

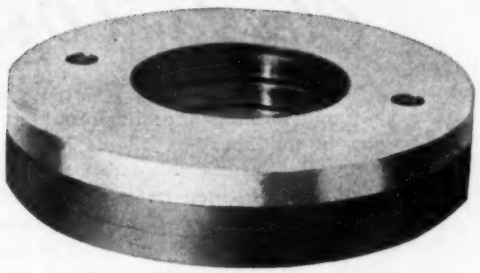
THE CARPENTER STEEL COMPANY
109 W. Bern Street, Reading, Pa.

The Standard Tool Steels of Industry

Tool Steel Selection Problem

PRODUCTION BOTTLENECK BROKEN

A prominent metal parts manufacturer first became acquainted with Carpenter Matched Tool Steels because of a tool-caused production bottleneck. A shaving die used in a punch press operation wore rapidly and would not hold size. An oil-hardening steel had been used but it lacked the necessary wear resistance. When Carpenter Hampden was selected for its maximum wear resistance and accuracy in hardening, production was increased from 99,600 to 504,000.



BREAKAGE ELIMINATED

After the first successful experience with Carpenter Matched Tool Steels, the tool room tackled another job. A staking punch used to stake nuts on a spindle had a short life that averaged 40 hours. The oil-hardening steel tried, either failed by breakage when treated for maximum hardness, or battered out of shape when drawn for greater toughness. No. 11 Special, a tough timbre straight carbon water-hardening steel was tried with excellent results. Punch life went from an average of 40 hours to more than six months service, and punch was still in good condition at the end of that time.

TOOL LIFE UP 66%

Confidence in solving tool problems with Carpenter Matched Tool Steels increased with results and inspired a search for improved performance on other jobs. High speed steel had been used for a burnishing punch. The selector section in the Carpenter Matched Tool Steel Manual recommended K-W (Water-Wear) for burnishing tools. The slick glass-hard surface provided by K-W gave a smoother, cleaner finish and tool life was increased 66%.

Carpenter MATCHED TOOL STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

CLEVELAND

Cleveland Open Back Gap Presses

CLEVELAND Open Back Gap Presses are used extensively for punching, shearing, bending and forming operations and are especially recommended for the convenience which the gap in the housings affords for the handling of large or irregular shapes and for feeding material right and left across the dies.

The illustration on the left shows a 60-G-72 Double Gap Press which has a capacity of 150 tons. The Press is single geared, single end drive and is equipped with an electrically controlled hydraulic clutch. The slide is counterbalanced by air and the flywheel is provided with a separate air brake to bring it to a quick stop. The Press has a bed area of 24" x 72", stroke of 10" and operates at 25 strokes per minute.

The illustration on the right shows an 80-G-96 Double Crank Gap Press having a flush front which permits the use of a table to suit various operating conditions. This Press has a capacity of 250 tons and is equipped with an electrically controlled hydraulically operated friction clutch and brake. The slide is air counterbalanced and the flywheel is provided with a separate air brake to bring it to a quick stop. The face of the slide measures 22" x 100" and the Press which has a 6" stroke, operates at 18 strokes per minute.

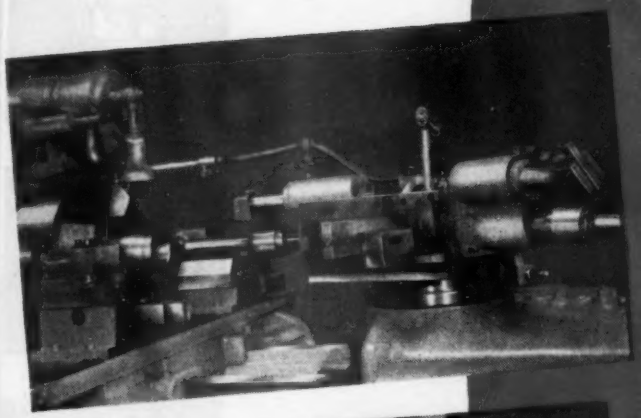
Cleveland Open Back Gap Presses can be furnished in either single or double crank and in sizes and capacities to suit requirements.

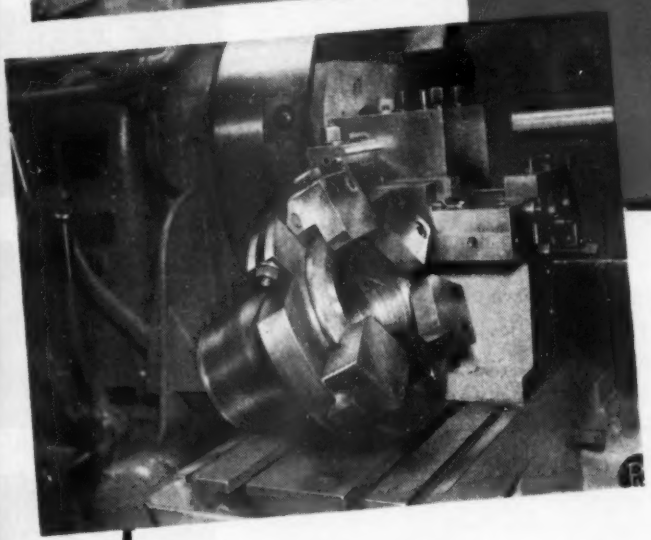
THE CLEVELAND PUNCH & SHEAR WORKS COMPANY

Cleveland 14, Ohio

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • PITTSBURGH

POST WAR PRODUCTION CAN BE HANDLED AT LOW COST ON PRE-WAR MACHINES BY P&J RE-TOOLING





This P&J Automatic Chucking and Turning Machine, Model 6 DREL, is doing a specific production job, with tooling set-up designed to handle the various operations involved in turning out gear halves of propeller blade gears. Its performance, in terms of time per piece and quality of work produced, has been outstanding.

●

While you may not know now the exact specifications of the part or parts you'll be producing after the war, one fact is certain — the function of your machine tools will be to cut costs, because more and better goods will have to be produced cheaper to enable consumers to get them for less.

Many of the problems in cost-cutting can be solved by re-tooling. The P&J machine, shown here on airplane parts, for example, can be converted by re-tooling for some job that lies ahead, with assurance of fast, accurate low cost work.

P&J welcomes the opportunity to meet the challenge of low cost. With highly specialized experience in tooling on which to draw, our engineers can be of invaluable service to users of P&J machines. May we discuss P&J RE-TOOLING with you?

POTTER & JOHNSTON MACHINE COMPANY

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P & J REBUILDING SERVICE

You are invited to investigate our RE-BUILDING SERVICE by which present P&J machines are restored in our shop to their original productivity and accuracy. RE-TOOLING can also be conveniently handled at the time of rebuilding.

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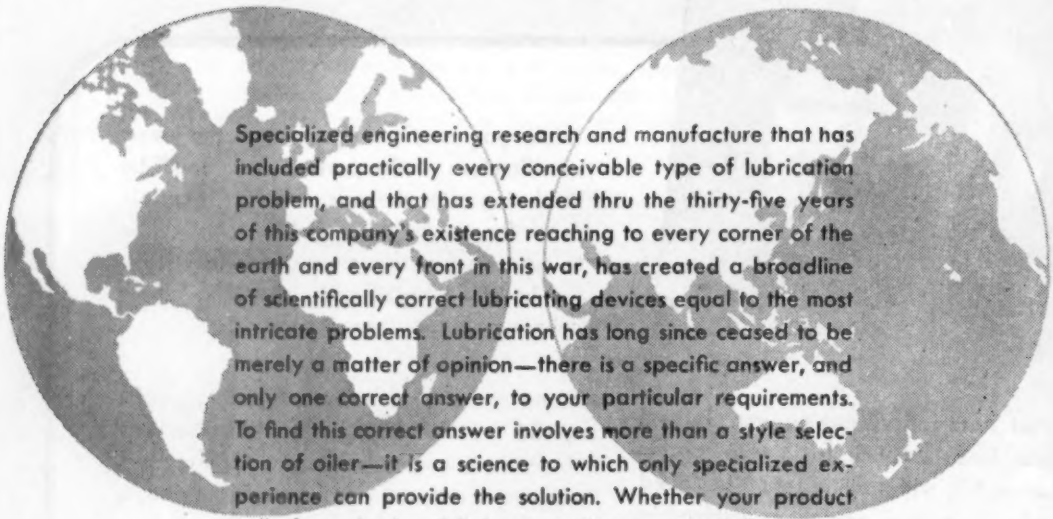

Specialized engineering research and manufacture that has included practically every conceivable type of lubrication problem, and that has extended thru the thirty-five years of this company's existence reaching to every corner of the earth and every front in this war, has created a broadline of scientifically correct lubricating devices equal to the most intricate problems. Lubrication has long since ceased to be merely a matter of opinion—there is a specific answer, and only one correct answer, to your particular requirements. To find this correct answer involves more than a style selection of oiler—it is a science to which only specialized experience can provide the solution. Whether your product calls for a lowly oil hole cover that is essentially a short length of tubing with a hinged cover, or a more intricate device that is required to automatically lubricate many points from a central reservoir with a measured quantity of oil at given time intervals—you will practice true economy and insure maximum efficiency and service by employing the experience of Gits Engineers—the kind of experience that has been acquired the hard way. When you are faced with a lubricating problem—consult Gits.

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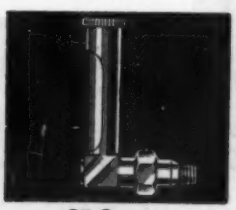
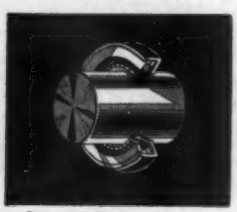
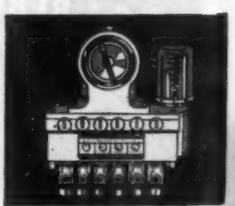


Oil Gauges



Oil and Grease Seals



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● Thompson Grinders are being used extensively in the manufacture of airplane parts to maintain the precision and smooth finish demanded on this close tolerance work. Moreover you will find that your production can be increased and costs lowered with this rigidly constructed grinder.

Absolute freedom of vibration is accomplished by the full hydraulic operation of both wheel spindle and table. Ease of operation is the result of convenient centralization of all operating controls. Thus its simplicity enables women operators to obtain both desired accuracy and production from Thompson Grinders.

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A complete range of types and sizes up to 36" x 36" x 240" are available. *Write for full descriptive bulletin.*

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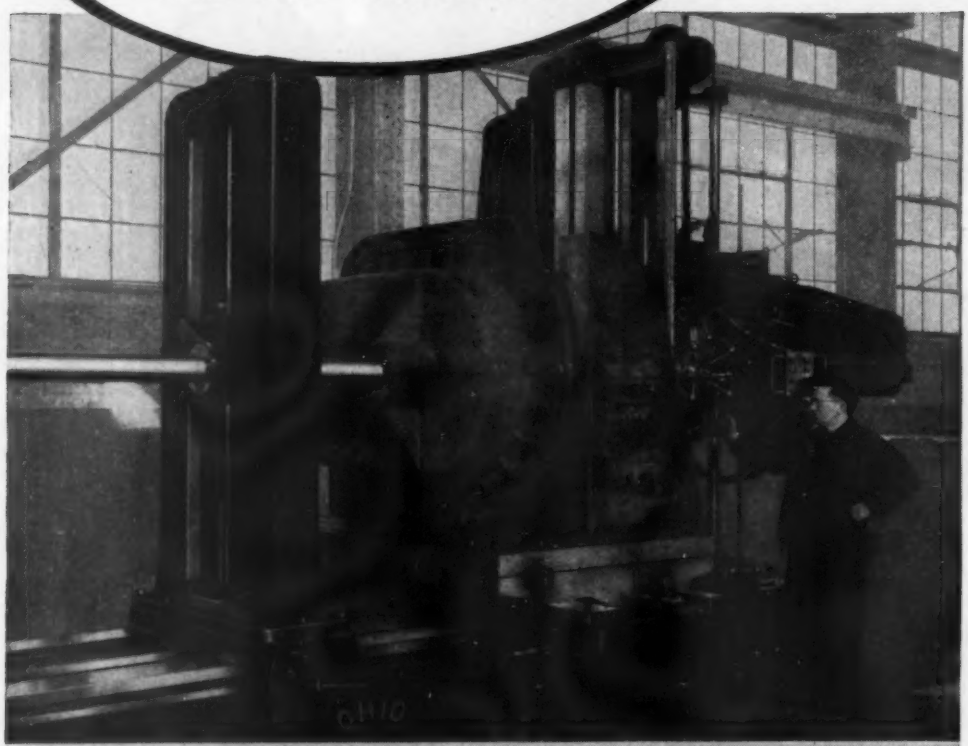

The accurate boring of large steel castings is facilitated on this Ohio Horizontal 5T-43A Table Type Machine by the sturdy boring bar support.

Ohio Horizontals have earned a name for accuracy, power and ease of handling. Such features as the following have made them standard equipment in many of the country's largest steel mills, shipyards, arsenals and heavy machinery producing plants:

(1.) Nitrided spindle; (2.) Anti-friction bearings throughout; (3.) Automatic lubrication; (4.) Built-in electrical power rapid traverse with push-button control; (5.) Narrow-guide construction for all moving units; (6.) Push-button control for start-stop, forward-reverse and run-jog of the spindle; (7.) Pressure lubrication to all sliding surfaces; (8.) Unit construction, providing accessibility to all units; (9.) Multiple-splined shafts with splines milled from the solid for sliding gears and clutches; (10.) All mechanical clutches of the internal gear tooth type.

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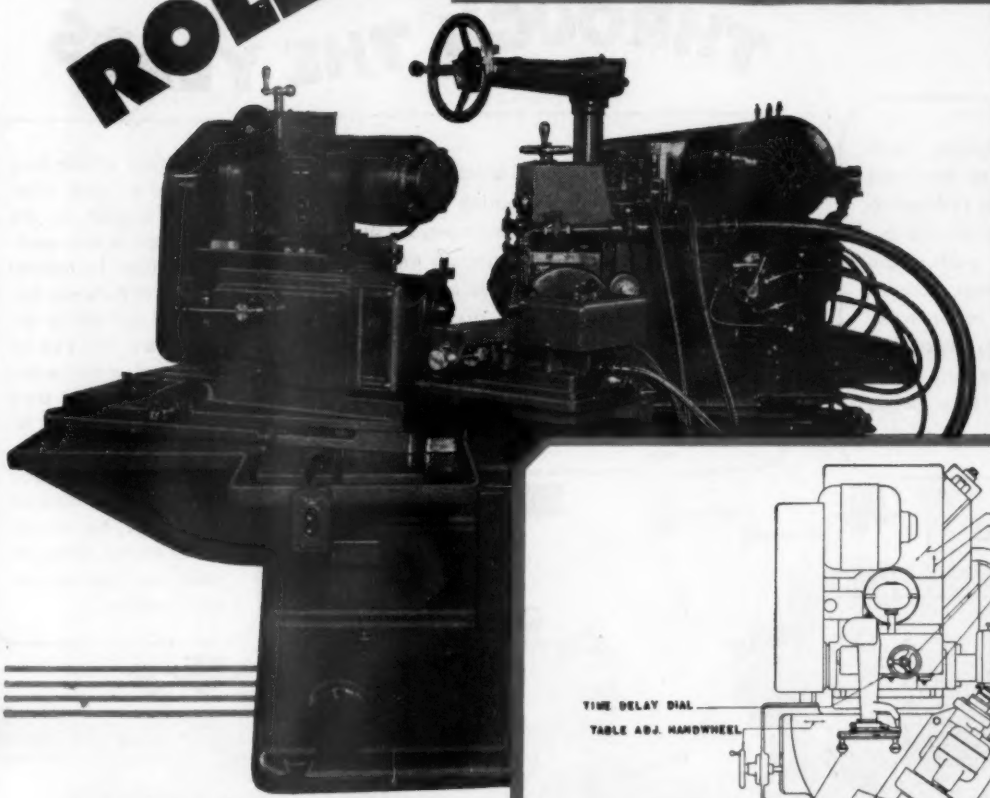
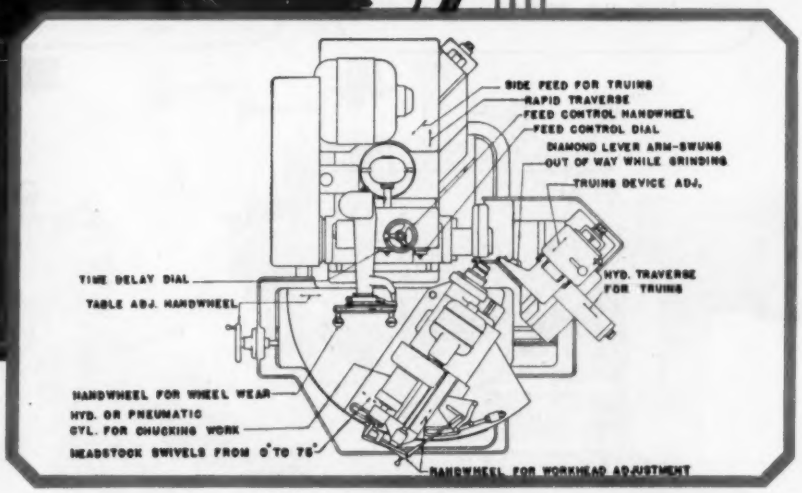
GRIND ROLLER BEARING RACES ON A FITCHBURG




SIDE FEED FOR TRUING
RAPID TRAVERSE
FEED CONTROL HANDWHEEL
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DIAMOND LEVER ARM-SWUNG OUT OF WAY WHILE GRINDING
TRUING DEVICE ADJ.
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HANDWHEEL FOR WHEEL WEAR
HYD. OR PNEUMATIC CYL. FOR CHUCKING WORK
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THE latest Fitchburg Roller Bearing Race Grinder employs a single standard Fitchburg Bowgage Grinding Wheelhead Unit. The workhead is adjustable from 0 degrees to 75 degrees so that the machine can be used for many other straight or taper grinding jobs.

The Fitchburg Roller Bearing Race Grinder is completely automatic. By pressing a single button the wheelhead goes through its standard automatic cycle — rapid traverse to the work, proper grinding feed, spark-out time, and rapid return. Work is held to limits of .0002" in production.

The workhead can be arranged either hydraulically or pneumatically for collet clamping or other chucking devices.

In this taper grinding application, the wheelhead is mounted on a 45° slide for trueing. The trueing device is mounted on the side of the base parallel to the wheelhead, and is hydraulically operated for trueing, with micrometer adjustment for positioning.

For grinding roller bearing races a Fitchburg grinds them faster and more accurately than other methods. A leading American manufacturer reports enthusiastically on the quality and low production cost of this machine. Write us today for complete information.

FITCHBURG GRINDING MACHINE CORP.

FITCHBURG, MASSACHUSETTS, U.S.A.

Manufacturers of — Bowgage Wheelhead Units, Multiple Precision Grinding Units, Spline Grinders, Cylindrical Grinders, Gear Grinders, Size Gages, Universal Grinders and Special Purpose Grinders

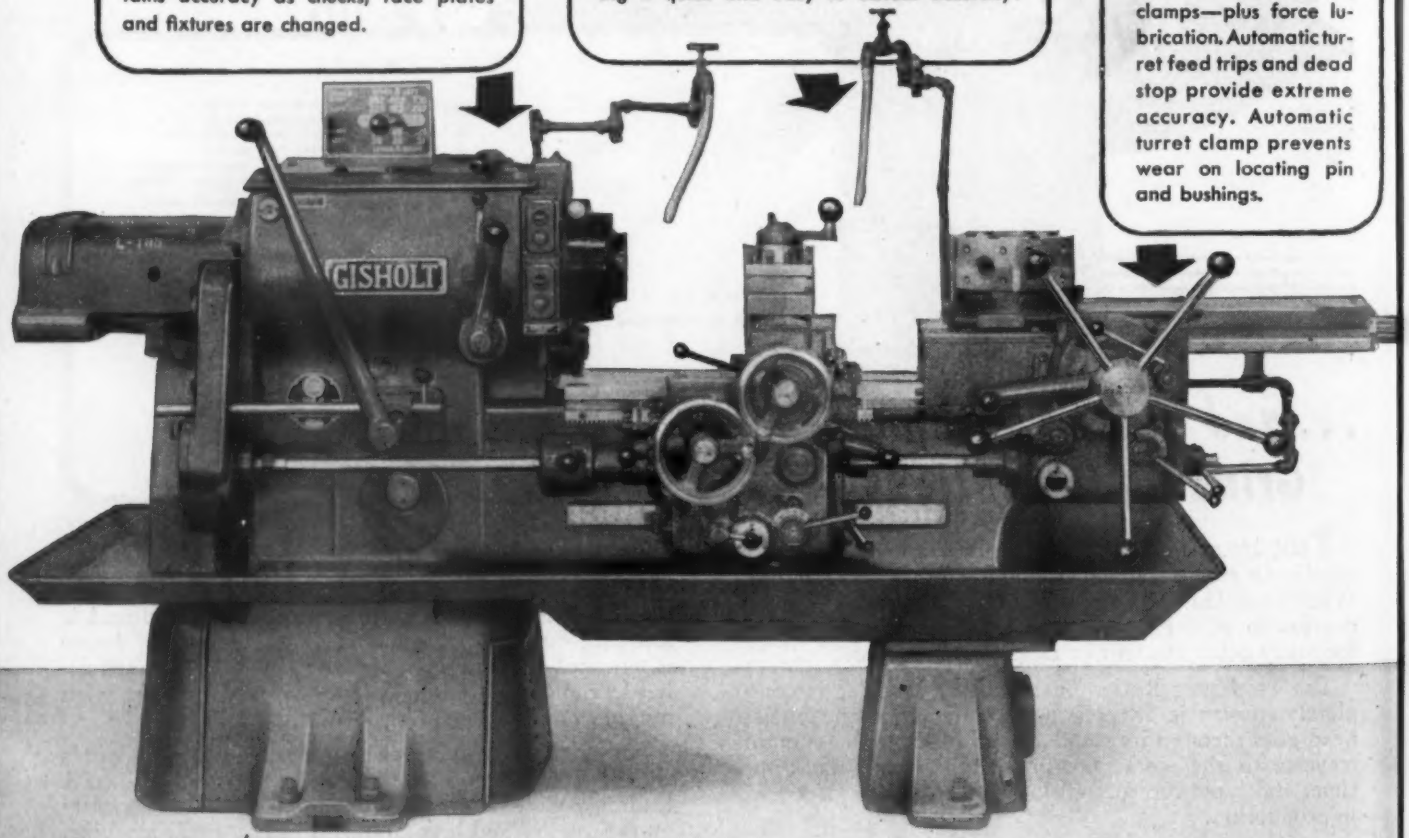
Accuracy...

THROUGH THE YEARS

HERE is where accuracy begins — with bed and headstock cast as one rigid unit that prevents distortion, reduces vibration, provides the foundation for accurate fittings of working parts. Rigid spindle of forged carbon steel, mounted between widely spaced taper roller bearings, assures utmost accuracy and stability. A flanged spindle nose maintains accuracy as chucks, face plates and fixtures are changed.

HERE are hardened steel block type ways, providing a permanent bearing surface not only on top to support the carriages, but also on both sides for exact alignment and beneath for the hold-down gibs and clamps. Force lubrication protects against wear. Large, cross feed dials provide thousandth inch graduations spaced 1/16" apart, making it quick and easy to obtain accuracy.

HERE is a saddle long enough to give adequate support to the turret ram in any working position. Permanent alignment between turret and spindle is assured by the use of hardened steel ways, tapered gibs and clamps—plus force lubrication. Automatic turret feed trips and dead stop provide extreme accuracy. Automatic turret clamp prevents wear on locating pin and bushings.



GISHOLT accuracy is lasting because it is found in every detail—in workmanship, materials and design. And looking ahead through long years of hard service, Gisholt has provided the means of compensating for inevitable wear to minimize the loss of accuracy. Before you invest in metal turning equipment, be sure you have full information about these new Gisholts.

GISHOLT MACHINE COMPANY • *1201 E. Washington Ave., Madison 3, Wis.*

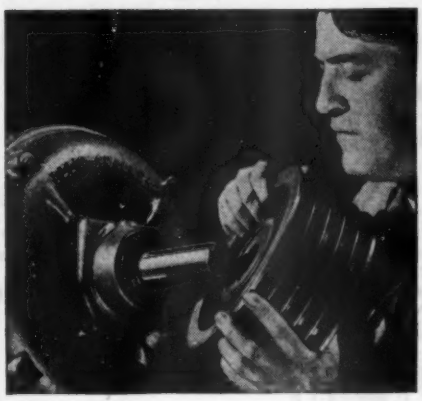
Look Ahead...Keep Ahead...With Gisholt Improvements in Metal Turning

GISHOLT

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

This locks this to this in 1 quick operation

Allis-Chalmers' new "Magic-Grip" with tapered split bushing is put on, aligned, locked to shaft *as a unit* — making it the fastest mounting and demounting sheave on the market!



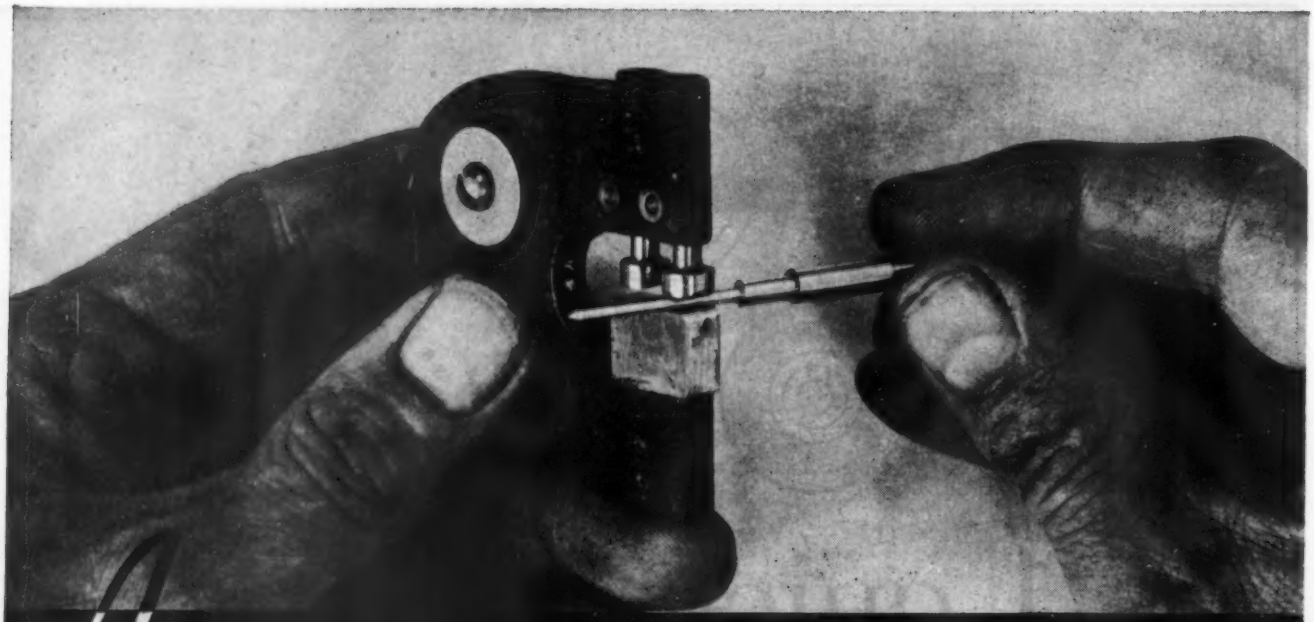
1 Place sheave on shaft. Slides on smoothly because clearance is provided by expanded bushing. There's *no* hammering — *no* forcing! Complete sheave and bushing unit comes intact—ready for quick, easy mounting.

2 Slide to desired position. Sliding easily, sheave can be placed *exactly* according to straight-edge . . . giving you true alignment with resulting smooth performance. A minimum of time is required.

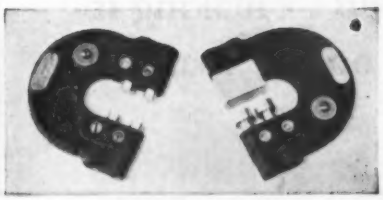
3 Tighten three capscrews — and it's ready to go! Entire sheave is locked securely to shaft and *grips like magic!* No set screws to damage shaft. Send for Bulletin B6310. Allis-Chalmers, Milwaukee 1, Wis.

A 1757

Allis-Chalmers Texrope "MAGIC-GRIP" SHEAVES



Announcing the NEW ATLANTIC *adjustable Limit* MIDGET TYPE *Snap Gages*



This new model MIDGET TYPE Snap Gage in now in regular production and available for prompt shipment. Made in accordance with American Gage Design—very light in weight—easy to handle—durable. ATLANTIC ADJUSTABLE LIMIT MIDGET TYPE SNAP GAGES are recommended for gaging small and delicate parts, pins, pivots, etc. They are highly accurate.

AVAILABLE IN THE FOLLOWING SIZES

Range .000 — .195"	List Price	$10.40
Range .195 — .385"	List Price	10.40
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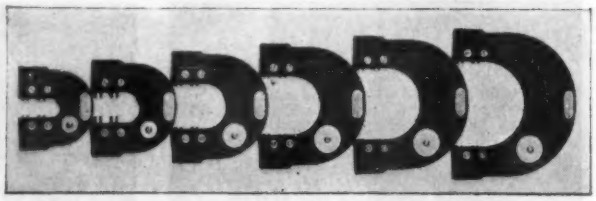
Write for discount. **ORDER NOW!**

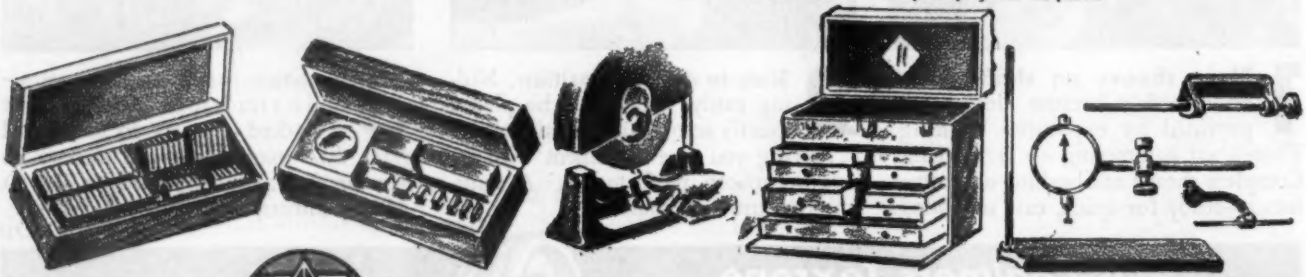
Adjustable Snap Gages with Special Anvils

Can be produced promptly in all varieties. Send prints of your requirements for quotation.



PRODUCTION SETS — Available for prompt delivery. Assure instant inspection. Made in standard sets of from 6 to 19 gages each—from 0 to 6" inclusive. Prices on request.

SEND FOR the complete 48-page SCHERR "LIMITED BUDGET INSPECTION LABORATORY" CATALOG. Sent promptly on request.



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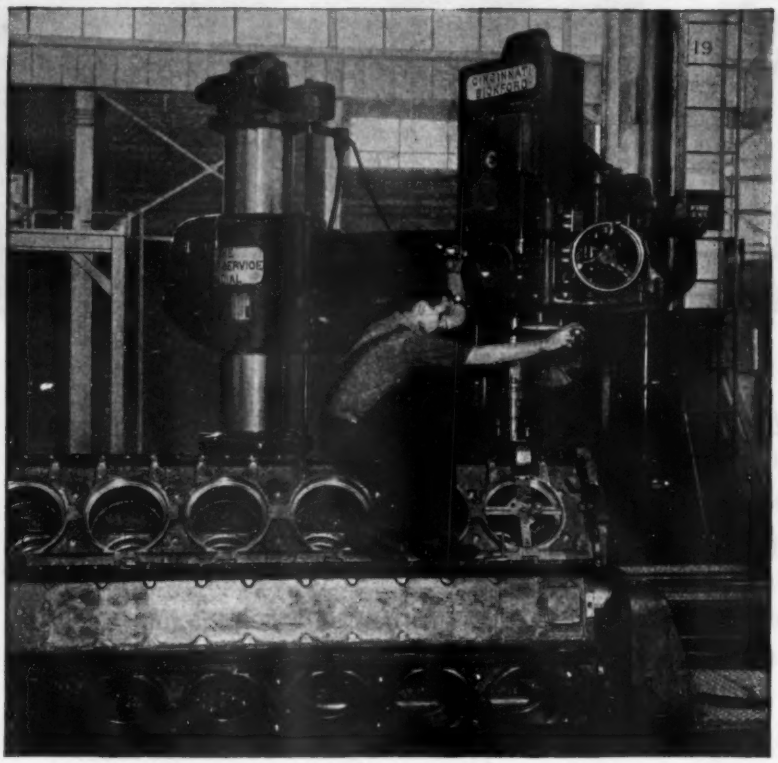
BUILDING DIESELS FASTER

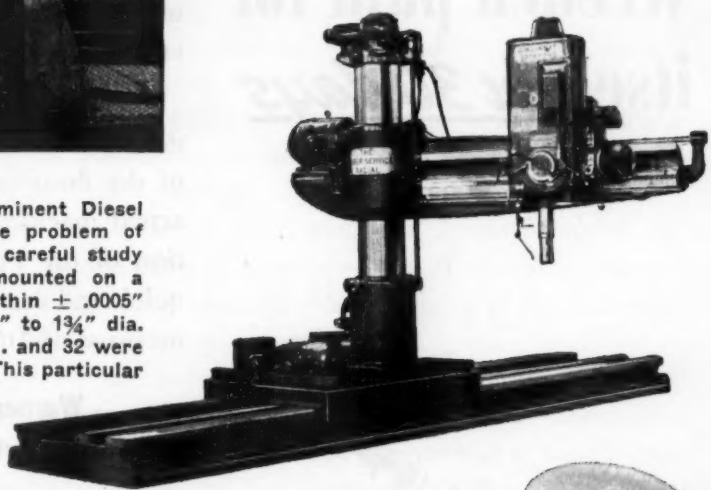
for the RAILROAD to VICTORY

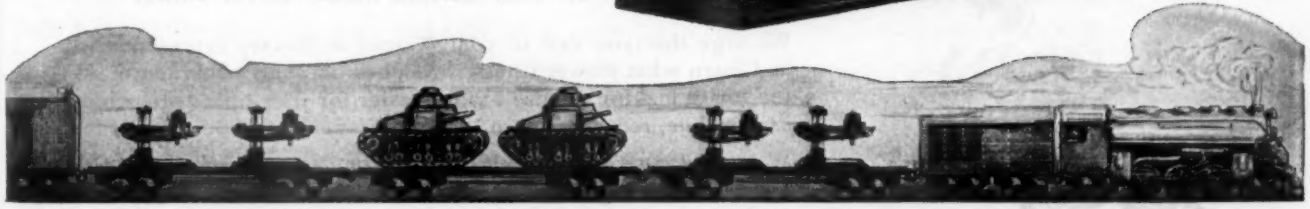


ABOVE: This machine is in continuous use by a prominent Diesel Engine manufacturer. They were confronted with the problem of drilling operations in their 5600 lb. crank cases. After careful study they chose the SUPER SERVICE RADIAL DRILL, mounted on a sliding base, to facilitate over 1200 operations, some within ± .0005" center-line to center-line . . . 611 holes ranging from ¼" to 1¾" dia. were drilled . . . 487 were tapped . . . 72 were reamed . . . and 32 were counterbored . . . with a floor-to-floor time of 24 hours. This particular type of machine was selected due to its extreme versatility of not only its head, arm and column, but also its base construction.

SUPER SERVICE

BELOW: Super Service Radial Drill equipped with sliding base and bed allowing 15' traverse. Ends of bed are machined for adding thereto, and bedways are automatically oiled by forced feed lubrication. Power traverse and electric clamping of the sliding base are push-button controlled at the head where all controls are conveniently grouped.





THE CINCINNATI BICKFORD TOOL CO.

OAKLEY • CINCINNATI 9 • OHIO • U. S. A.

This Power Chuck Wrench paid for itself *in 30 days*

AMONG other vital war jobs, the Uff Machine Company, Upland, Penna., makes bases for 75 mm. shells. The section gripped in the chuck is manganese bronze, soft material that can easily be marked and spoiled by too heavy chucking pressure or by slippage under too light a grip. Holding to extremely close tolerances, simultaneous turning and facing cuts are taken, and then the piece is threaded.

Before the Power Chuck Wrench was installed on the 1A Warner & Swasey, chucking time consumed most of the floor-to-floor time required for the job, as the actual machining was a short operation. The installation of the Power Chuck Wrench made chucking so quick and easy, that the time saved meant an immediate increase of 100% in machine output.

Warner & Swasey Power Chuck Wrenches Can Be Put on Your Current Model Turret Lathes

We urge that you call in your Warner & Swasey representative and learn what Power Chuck Wrenches on your machine can do for you in making the day's work easier for your operators, while saving time, reducing scrap loss, and increasing production.

See your Warner & Swasey field representative or write Warner & Swasey, Cleveland, Ohio.

WARNER & SWASEY · CLEVELAND OHIO

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

TURRET LATHES, SADDLE AND RAM TYPES—CHUCKING AND BAR TOOLS—
TAPPING AND THREADING MACHINES

Mr. Byrnes Offers a Plan

WE DON'T KNOW how much weight Mr. Byrnes' report to the President on reconversion will carry or how many of his recommendations will be adopted, but he has set a pattern for governmental action that industrialists should cheer.

He went on record to the effect that at the end of the war with Germany, "controls now in existence will be released or modified to the fullest extent possible" to enable industry to resume civilian goods manufacture at least equal to the 1939 volume.

He said that materials should be removed speedily from contractors' plants, a matter that has been a source of worry for fear the government would not act quickly enough.

The Controlled Materials Plan should be discarded, L and M orders revoked, and private plants not normally engaged in war production should be given the first priority in the release from war production.

The government should make advance payments and temporary loans to war contractors cut off from war work and desiring to transfer to civilian operations right away.

With Germany's defeat should come an end to the necessity for existing manpower controls, which should be largely abandoned. Just as soon as supplies are adequate in any commodity now rationed, rationing should be eliminated.

The excess profits tax should be repealed and manufacturers should be given some idea of what their taxes will be. Commented Mr. Byrnes, "Before a man puts his own money and asks his friends to put money in a business, he wants to know that there is some prospect of making a profit."

Tucked away in the report was a thunderbolt. "We should consider the advisability," said Mr. Byrnes, "of allowing manufacturers to depreciate new machinery substantially in the years in which such machinery is purchased. Great Britain has incorporated such a plan in its current budget.

"This action would induce many companies to hazard new ventures, thereby increasing employment. It would give a real incentive to companies to keep our industry ahead of the rest of the world technologically.

"It would provide a steady domestic market of substantial proportion for capital goods and would go far to provide a stable basis for employment in that field in the postwar readjustment."

Mr. Byrnes commented that the Baruch-Hancock report "should continue to be the guide for reconversion policies."

There is good reason to believe that Washington has waited until a late hour to give serious thought to reconversion and that the sudden end of the European phase of the war will catch the government unprepared for the action that must be taken posthaste.

There is good reason to be suspicious of the intentions of some people in Washington who are not and never have been friends of the American system of free enterprise.

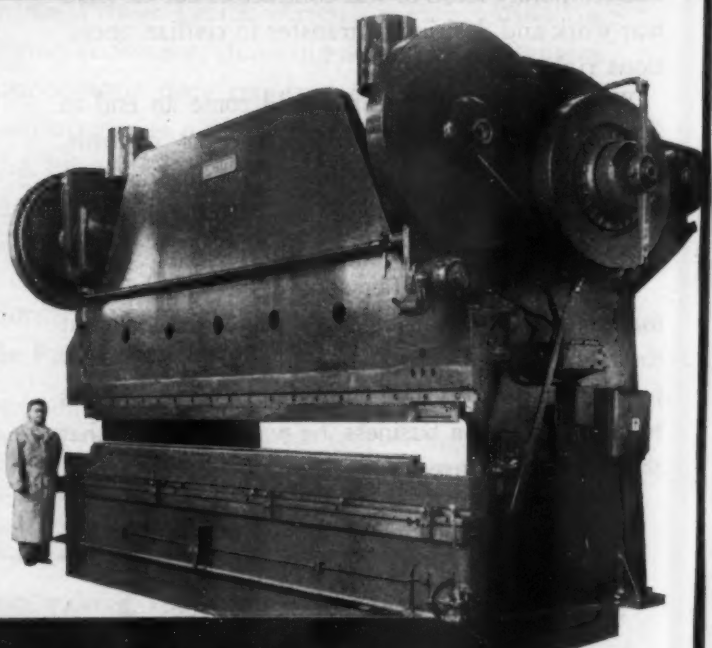
But from the center of the administration—from one wing of the White House at least—has come a report on reconversion policies that is sound, constructive and heartening.

Mr. Byrnes deserves high praise for his reconversion plan.

Burnham Finney

Stiffeners for Navy pontoons are formed rapidly and of equal importance accurately —3 bends in one hit. Removable angle brackets on the bed and ram give the wide die surface required for this type of job. This is just another example of the wide versatility of Cincinnati Press Brakes.

Consult our Engineering Department on your job or write for Catalog B-2, showing many applications of Cincinnati Press Brakes.



THE CINCINNATI SHAPER CO.

CINCINNATI OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

Flush Pin Gages Meet Stiff Ordnance Requirements

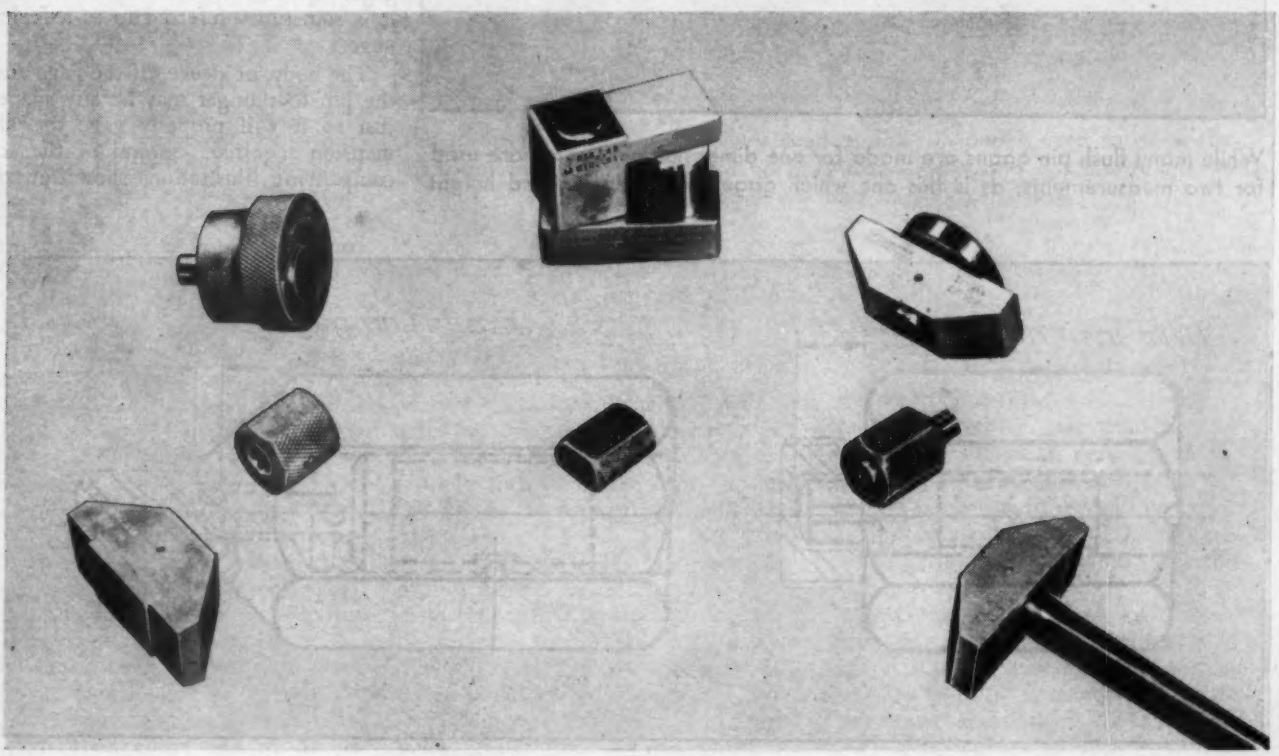
BY CAPT. WALLACE L. KIMBALL, CHIEF,
GAGE ENGINEERING AND DESIGN SECTION, FRANKFORD ARSENAL

Ordnance gage experts advocate adoption by industry of this type gage, which is simple and inexpensive, and which is not damaged in storage or shipment

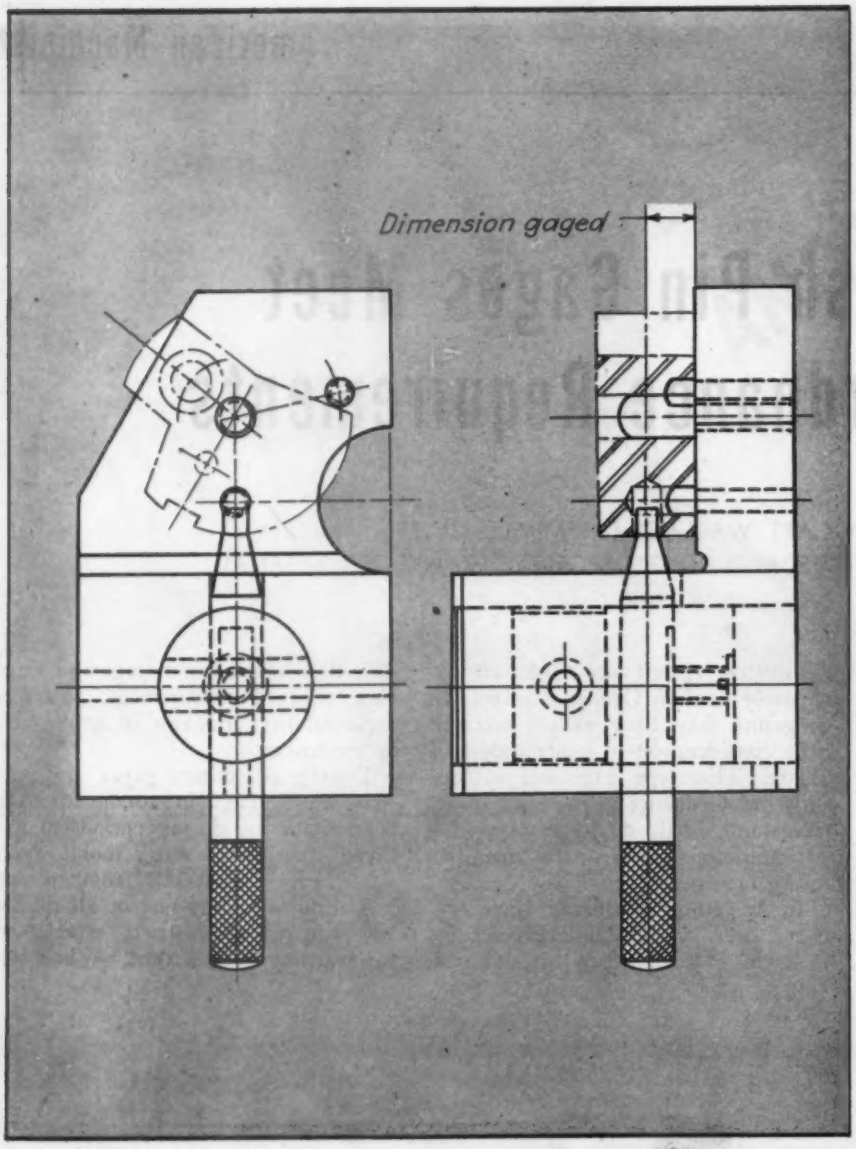
ALTHOUGH FLUSH PIN GAGES are extensively used in Ordnance inspection programs they have as yet received little consideration in many industrial plants. This type gage has successfully met Ordnance inspection requirements and should merit greater appreciation among metal parts manufacturing facilities.

In designing Ordnance inspection gages, consideration must be given the following factors: fragility and possible deterioration in storage and shipping; ease of procurement; accuracy; dependability; and, ease of application by the inspector.

During peacetime, gages are purchased and placed in storage for long periods for use during periods of national emergency. After mobilization starts, gages are taken from storage and shipped to any one or all of the 13 procurement districts established for wartime procurement. When the



Flush type pin gages, sometimes known as feeler gages, found wide usage in ordnance inspection work. Here are a few typical gages of this type. The variety indicates many uses to which such gages may be put



While many flush pin gages are made for one dimension only, some are used for two measurements, as is this one which gages hole location and height

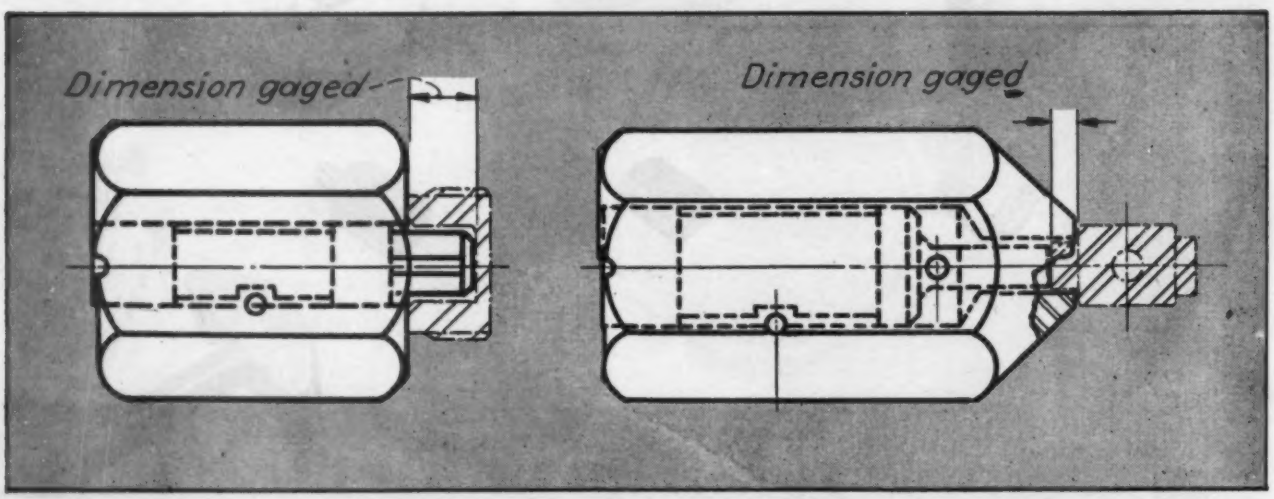
gages arrive they must be in perfect functioning condition and give the same results in San Francisco as in Detroit or New York.

The flush pin gage answers the requirements of a suitable gage for Ordnance use. When properly stored it can remain in storage indefinitely, be packed and shipped when required and when unpacked and cleaned at a distant point, can immediately be placed in operation and function perfectly for a long time. Other types of depth indicators and micrometers frequently are damaged in storage or shipment and must be renovated or adjusted after unpacking.

Slides in Bushing

This type gage is essentially a pin sliding in a sleeve or bushing of suitable shape and size. The fit of the pin in the sleeve must be a close slide fit to prevent errors due to side play. The tops of pin and sleeve are accurately finished at right angles to the axis and a step is cut in the sleeve equal to the tolerance of the component for gaging toleranced dimensions. When the component is correct, the top of the pin will fall between the two steps. For dimensions which require gaging only of a maximum or minimum dimension, no step is cut on the sleeve. Such a gage is simple to use because the inspector merely puts the component and gage together and moves his finger across the top of the gage. Because of the way it is used, it is sometimes referred to as a feeler gage.

The body, or sleeve, of the gage and the pin or plunger may be any shape, just so it will properly gage the dimension required. Several of the accompanying illustrations show how to



These two flush pin gages are used to check depth of hole (left) and to gage height of a boss, respectively. They are among the most simple gages, are easily made and give long service life

obtain dimensions for flush pin gages on the simpler types of gages for depths of holes and heights of bosses.

Principal uses of such gages are for gaging location of holes and thickness of metal in places hard to measure with other instruments, as well as gaging depth of holes and height of bosses.

In designing flush pin gages the following precautions and rules should be observed:

The diameter of the pin entering the hole to be gaged, is to be calculated 0.002 in. under the minimum diameter of the hole, with a minus 0.001 in. tolerance. Exceptions to this rule are made when the minimum difference between the hole and its mating component is 0.003 in. or less and when a press fit exists between the mating components. In the case of 0.003 in., or less, difference between parts, the diameter of the pin will be 40 percent of this difference subtracted from the minimum hole. In the case of a press fit, the diameter of the pin will be the minimum diameter of the hole, with a tolerance of minus 0.0002 in.

Bodies of simple gages should be made from hexagon stock. Complicated or built-up flush pin gages are exceptions to this rule.

The following note should be placed on all flush pin gage drawings showing gages made from hexagon stock: "Body may be round stock with two flats for marking. Groove dividing steps to be at right angle to flats."

Sight Hole Needed

Under conditions in which the component slides into the gage, a sight hole as large as is convenient or necessary should be provided.

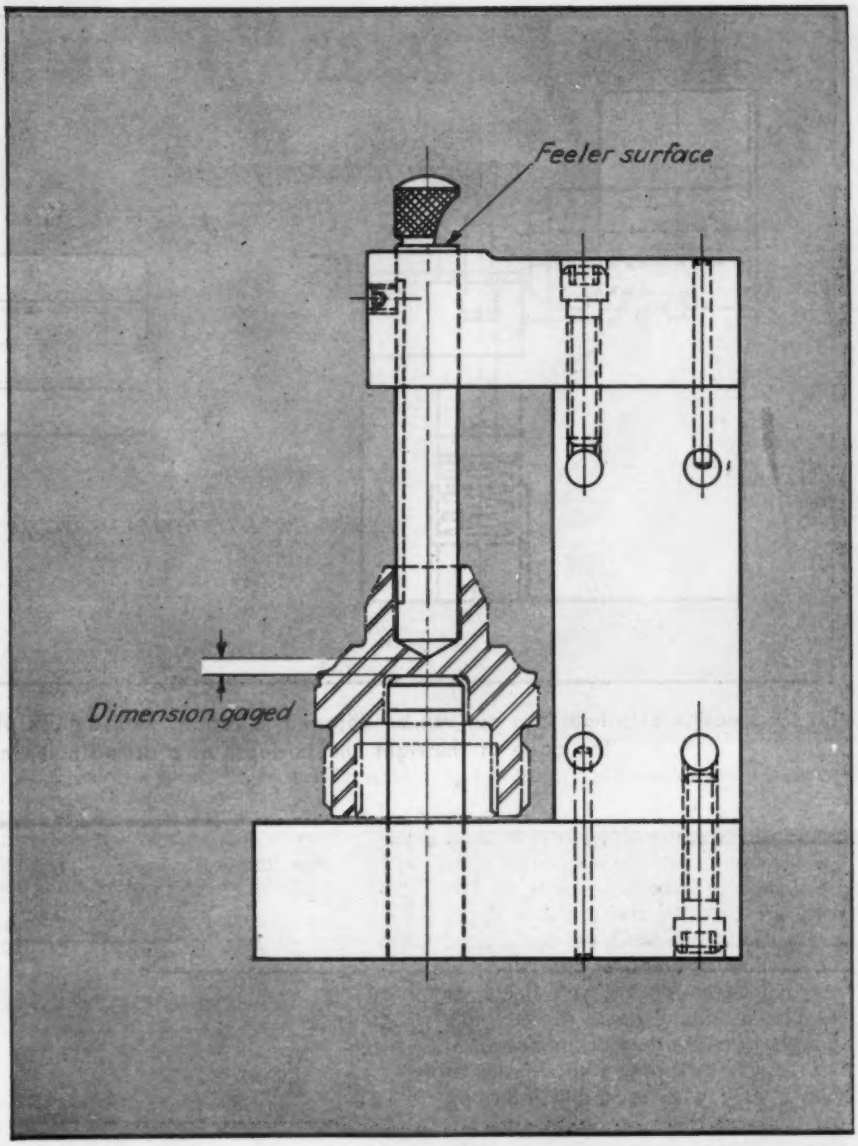
In general, no flush pin gage should have the body shorter than 1¼ in. in length or smaller than ⅞ in. across flats.

Pin diameters that are slide fits in bodies should be ⅜ in. in diameter, or larger and dimensioned in vulgar fractions, where practicable. The reason for the latter being that if called for in decimals, too much importance may be attached to size, when the object is merely a good slide fit.

Length of holes for lapped slide fits for pins should, under ordinary circumstances, be greater than three diameters or less than two diameters. There will be several exceptions to this rule under varying conditions.

Whenever possible, the section of the pin that is a slide fit in the body should be relieved, maintaining a bearing surface on either end of its engagement in the body.

Movement of flush pins should be limited by the use of a straight dowel pin driven into the body with a flat on the side of the pin.



This flush pin gage has the feeler area at the top and is used to gage the minimum thickness of a metal part. Arrangement and complexity of the gage depend upon size and shape of the part

Pin Limits Movement

Some conditions demand the use of a flat on the pin with a screw in the body for limiting the movement of the pin. In such cases, the depth of such flat will be 20 percent of the diameter of the pin.

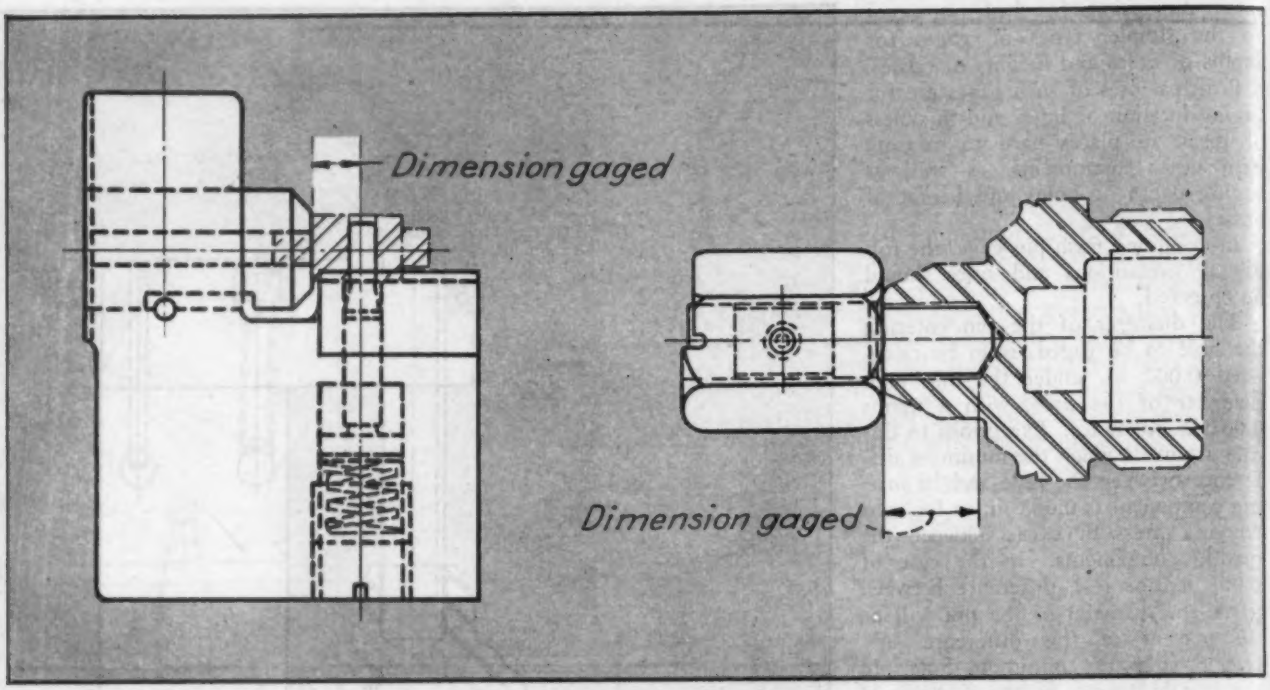
All flush pin gages to be used for gaging drilled holes less than ⅜ in. diameter, drilled with a standard drill point angle, should have a flat bottom flush pin with a chamfer of 0.005 in. minus 0.004 in. by 45 deg.

All flush pins for depth of drilled holes greater than ⅜ in., where the intersection of the cylindrical portion of the hole with the tapered portion has a radius of more than 0.01 in., or the volume is important, should have a flush pin designed according to a special formula.

On all flat bottom flush pin gages for depth of drilled holes, the minimum depth on the gage should be the same as the minimum depth given on the component and the maximum depth on the gage should be calculated as the maximum depth, as minimum gage pin will enter a maximum component hole.

Since the pin and body of a flush pin gage must be designed individually for each gaging operation, the gage is not adaptable to standardization. On very close tolerance and borderline cases it is difficult to feel when the component is acceptable.

On components having close tol-

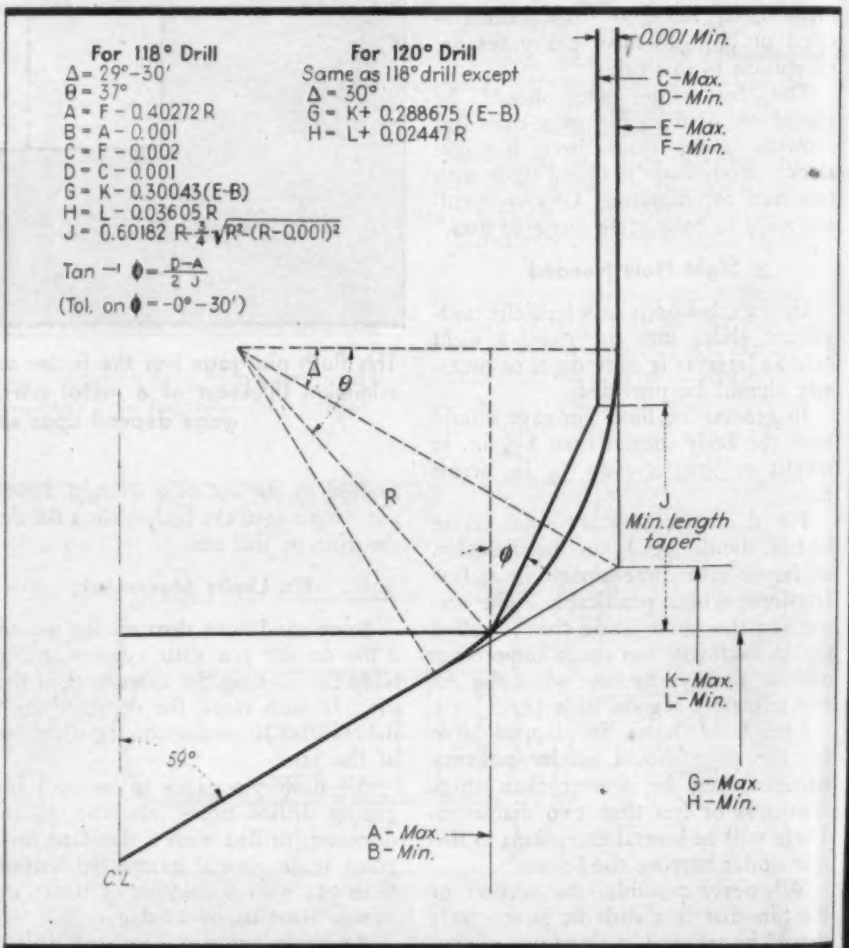


Proper location of a hole in a pin can be determined readily with a flush pin gage of the type shown at the left. The gage at the right checks depth of a drilled hole, in the manner shown

erance or requiring rapid inspection of a large number of pieces a dial indicator gage is frequently used. In this case, the parts of the pin and sleeve which contact the work are constructed the same as for the flush pin gage, but the dial magnifies the movement of the pin, making it easier to determine the condition of borderline cases. It is necessary to supply a check gage or setting gage with each dial indicator, for frequent checking of the dial setting. These gages are especially adaptable to measuring depths of holes or heights of bosses. It must be remembered that the dial adaptation of the flush pin gage has the disadvantage of being more fragile in shipment and in storage, but has the advantage of being faster to use.

In designing flush pin gages, care should be taken in placing warning and precautionary notes on the working drawings. Included among the notes are those stating that the pin must slide freely without shake or sideplay; dimension markings to appear on the gage; and, on gages for measuring between two limits, a note to the effect that the gage must be flush with steps for maximum and minimum dimensions.

Since the flush pin gage is so sturdy and dependable, and has such a long wear life, many manufacturers are adapting it to their war production inspection schedules and probably will continue using it on peacetime production.



The method shown can be used to calculate pin dimensions for checking depth of drilled holes where point is not specified, or given as 118 deg.

Drilling Structural Angles Simplified

BY C. W. HINMAN

IT IS USUALLY quite difficult to design and build a practical jig for drilling both legs of long right angular sections. For drilling short lengths of angles, under about 2 ft., an ordinary box jig will serve the purpose. However, when confronted with designing a drill jig for structural steel angles which are 8 to 12 ft. long, and perhaps longer, with legs of unequal widths to drill, and possibly a twist in the work length, it is not a coveted job among experienced tool designers.

The first error an innocent designer usually makes is to think he has an easy job to do. Then he brings into the world a long channeled contraption, with a removable leaf, that has a surplus of clamps and binding screws. If the longitudinal twist in the work is a severe one, and the stock heavy, it will put a similar twist in the length of the jig when tightening the screws. That kind of a jig takes too much time and involves too many headaches to load and unload the work, because there are too many screws and clamps.

Mr. R. K. Best, of the General Electric Company, Pittsfield plant, seems to have found the answer. His jig, or fixture, consists of a T-bar holding assembly, equipped with graduated scales and indicators for quick, easy, and accurate movements of the jig and work, both longitudinally and laterally. This entire fixture rides on rollers located in a channel, the sides of which act as guides, and the fixture and work can be easily moved in a lengthwise direction by the operator.

Fig. 1 shows how the desired points to be drilled in the angle can be located directly under the drill. The fixture is moved in a crosswise direction through a screw controlled by a handwheel, conveniently located at the front of the fixture. The lengthwise locations of holes are obtained by moving the T-bar assembly and work in the desired direction and to the proper distances as shown on the scale.

The angle to be drilled is held in place by hand-operated clamps. These clamps are provided on both sides of the T-bar to permit drilling both legs of the angle by simply removing the work and clamping the other leg, thus it is unnecessary to turn the piece end for end. The hand screws easily could be converted to air clamps, if production requirements were large enough. This would reduce time required for loading, unloading and clamping. Air clamps are provided to lock the entire assembly in position when properly set for drilling.

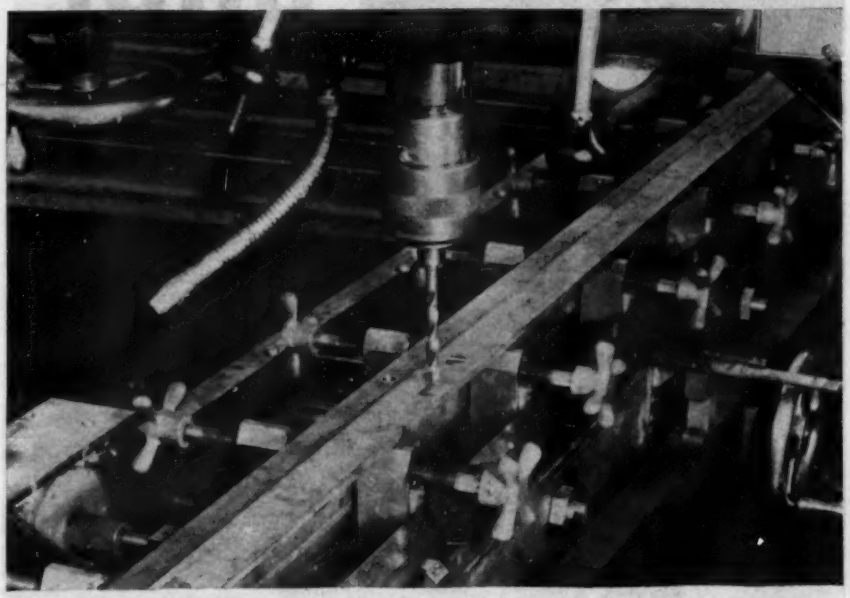


Fig. 1—The angle being drilled is held by air-clamp and moved by handwheel

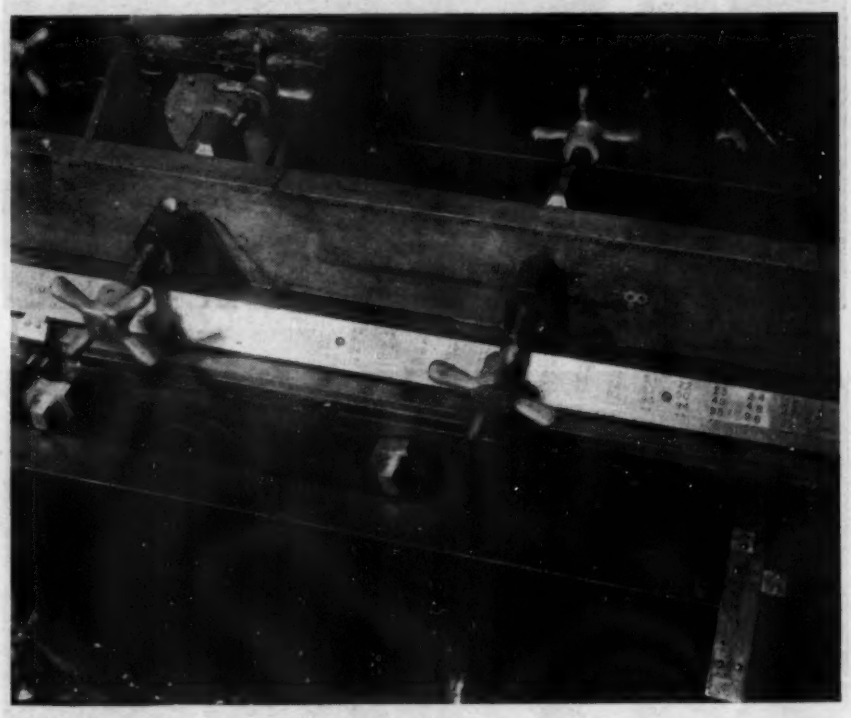


Fig. 2—Accurate longitudinal and lateral adjustment is made by means of scales incorporated in the fixture

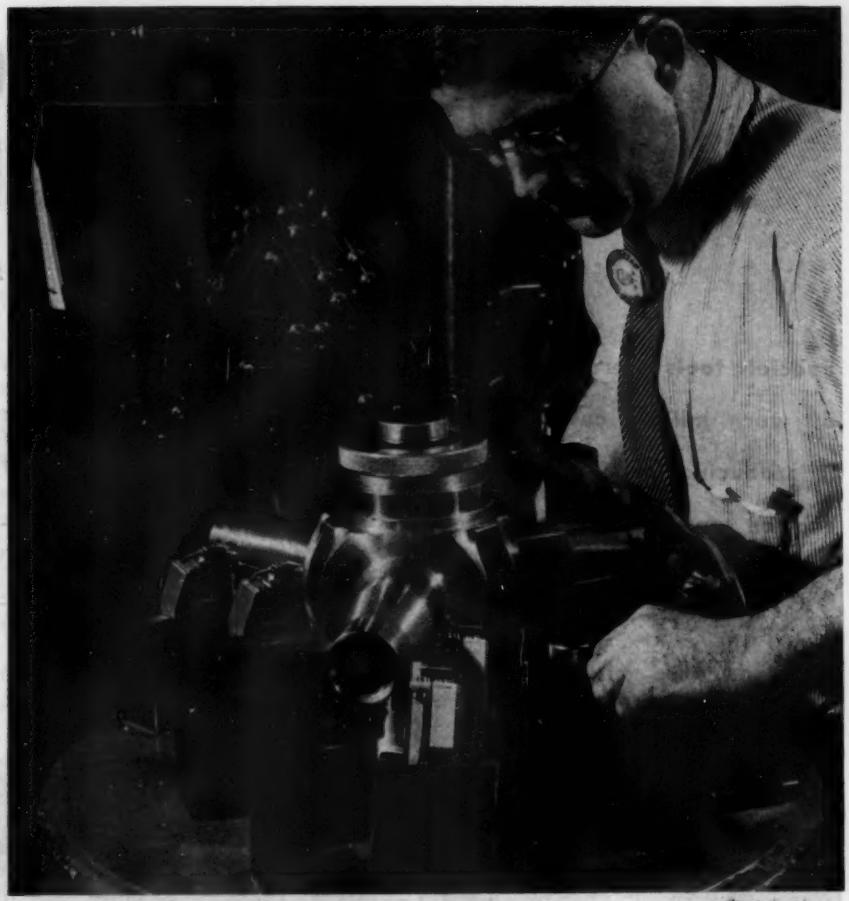
Longitudinal and lateral graduated scales which are directly in front of the operator, are seen in Fig. 2. This is an easy-to-read position. A chart is given with each set of angles to be drilled. From the chart, the position of each hole center can be determined by moving the fixture and scales to a positive score line, and then air clamping the fixture and drill the hole.

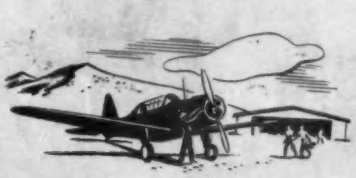
SHOP SHOTS

Spotlights have a place in industry, as is proven by this application in Caterpillar's X-ray laboratory. The small spotlight unit, which contains a 110-volt bulb, is supported by a swinging bracket on the outer case of the head of a G. E. 250,000-volt X-ray unit. By moving the X-ray head until the circle of light projected by the spotlight strikes the surface of the object at the point where the X-rays are to be focused, it is possible to reduce set-up time materially. When the head has been positioned, it is a simple matter to snap off the spotlight switch and swing the spotlight unit out of the way. Caterpillar Tractor Company.

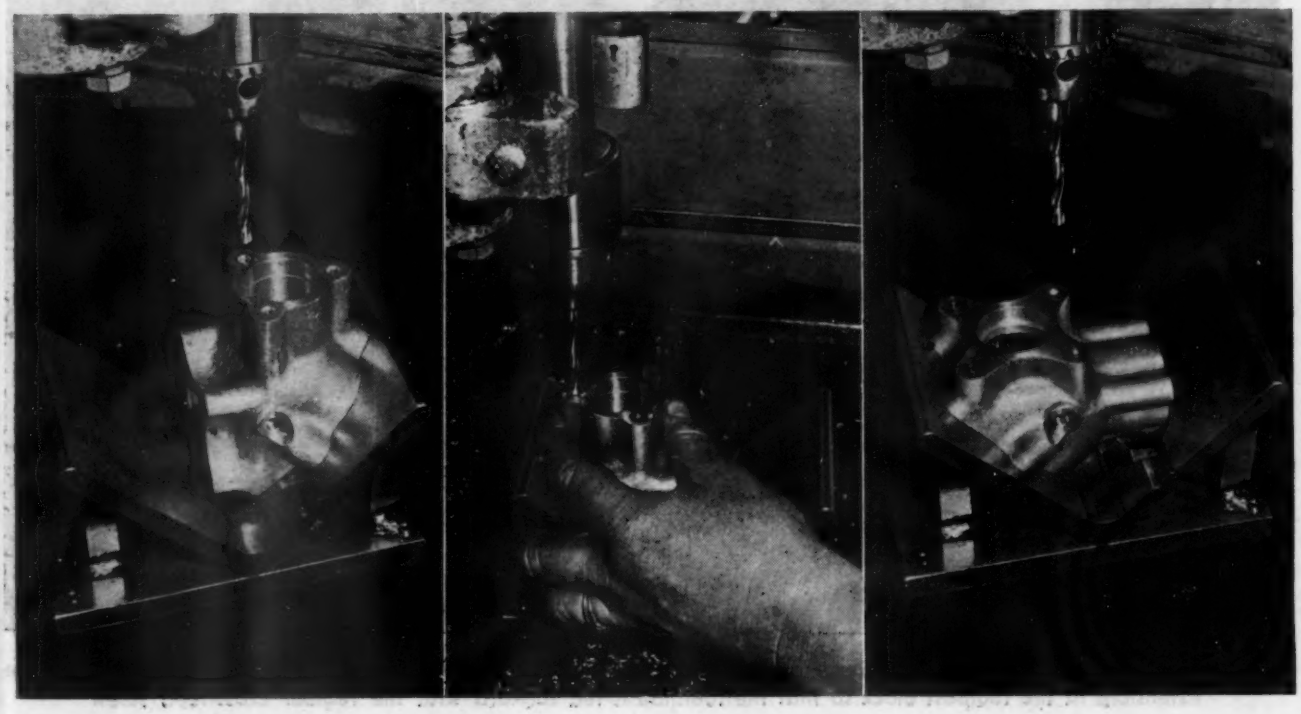
Spherical turning on an aircraft machine gun mount is done in a novel set-up on a Jones & Lamson turret lathe. A circular drum pivoted on the machine cross-slide supports the tool. This drum is grooved for a double turn of wire rope one end of which is fastened to the turret carriage and the other to a counterweight. The cast workpiece is mounted on an arbor held in the spindle collet. The combination of spindle rotation and turret feed generates the desired spherical surface. North American Aviation.

Aircraft propeller hubs are gaged electrically in this set-up known in the shop as a "Christmas Tree." Each leg of the spider comes in contact with vertical and horizontal gaging points on two bearing surfaces. Stops at the control leg give the setting position; then accuracy of all the other points are indicated by colored lights (green if within limits, red if not). Thus angularity and parallelism are determined quickly and visibly to the tenth-thousandth precision needed for this work. Hamilton Standard Propeller.





A three-position fixture is made from a piece of angle iron and a few scrap ends of steel plate arc welded together. The workpiece, a flap control gear box, must be drilled and tapped in three directions. During these operations it is supported at the three angles illustrated. Although the fixture is simple, the angles are accurately ground to hold the desired limits. Vultee Field Division, Consolidated Vultee Aircraft Corporation.



Heavy Slotting Tools Devised for Turret Lathes

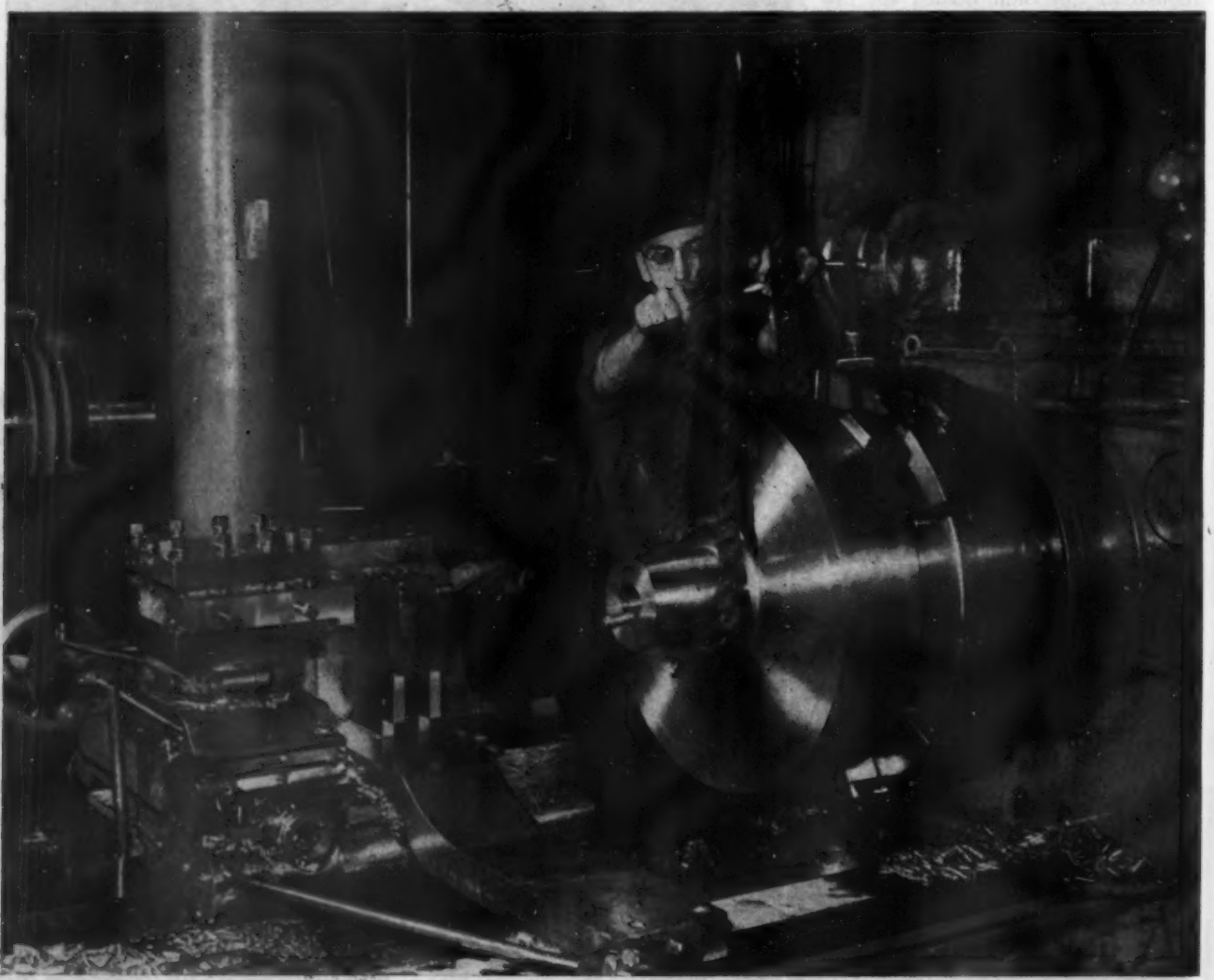
BY E. SPERISEN, SUPERINTENDENT, NORTHERN WORKS, GISHOLT MACHINE COMPANY

Special tools permit the use of worn milling cutter blades in producing large torsional vibration dampeners for diesels

ONE OF THE PRINCIPAL war subcontracts undertaken by the Gisholt Machine Company involves the manufacture of large torsional vibration dampeners for diesel engines, such as are used for propelling various Navy craft. Essentially, these dampeners consist of a large forged steel spider into which are assembled a number of heavy steel counterweights. Each of the heat-treated steel spider forgings weighs approximately 630 lb. in the rough state; when finish-machined, the spider weighs about 250 lb.

Every effort has been made to machine the component parts for the vibration dampeners on equipment available in the shop. This means that in some instances parts are machined on equipment not normally employed for such operations. Sometimes special tools have been necessary to permit machining the parts on standard equipment. Wherever possible, these tools are designed so that standard cutting tools can be used; it is better to divide a job into two operations using standard cutters than to use a special set of gang or form cutters and do the work all in one operation. This practice of simplifying the work makes it possible to train inexperienced men quickly.

Machining operations on the heavy



A special toolslide is mounted on a fixed base beside the toolpost cross-slide on the carriage of this lathe. Toolslide extensions fit the toolpost block so that the toolslide is fed forward with the regular cross-feed screw

spider for the vibration dampener involves the machining of two slots, each approximately 1 3/16-in. wide and 7¼-in. deep around the periphery of the spider forgings. These heavy slotting cuts are made on a standard No. 4-L Gisholt turret lathe driven by a 25-hp. motor. For a heavy slotting job of this nature, the company ordinarily would have made a special cross-slide carriage for the turret lathe, but it was necessary that this machine be kept in operation on other work until the tools for the slotting operation were ready, and it was also essential that the time necessary for retooling the lathe be held to a minimum. For this reason, a special cross-slide attachment was designed and mounted on the carriage of the turret lathe beside the standard cross-slide.

Two 1 3/16-in. wide slots 1⅛-in. apart are turned in the spider of the vibration dampeners in this set-up on a No. 4-L Gisholt turret lathe. Special heavy-duty slotting tools insure the efficiency of this operation

Special Tooling Set-ups

This special tooling consists of a cast-steel fixed base mounted on the front wing of the carriage and extending across the lathe so that the outer end bears on the rear way. It is held down against the rear way by a gib plate which slides along the under surface of the way bar. On top of the fixed base is a heavy cast steel tool block slide having two extensions which fit into two of the tool slots in the 9-in. square toolpost on the standard cross-slide. A ¾-in. square hardened steel key mounted in the fixed base guides the tool block slide as it is fed forward with the standard cross-slide feed screw. The tool block slide is machined to take two heavy slotting cutter blades which are 1.180 wide, 5 to 5½-in. deep and approximately 15¼-in. long. The slide has two extensions which support these blades when they are clamped in position. The fixed base and the tool block slide are cut away to a radius of 11¼-in. to clear the 21¼-in. dia. work piece when the slotting tools have been advanced to the full 7¼-in. depth of cut.

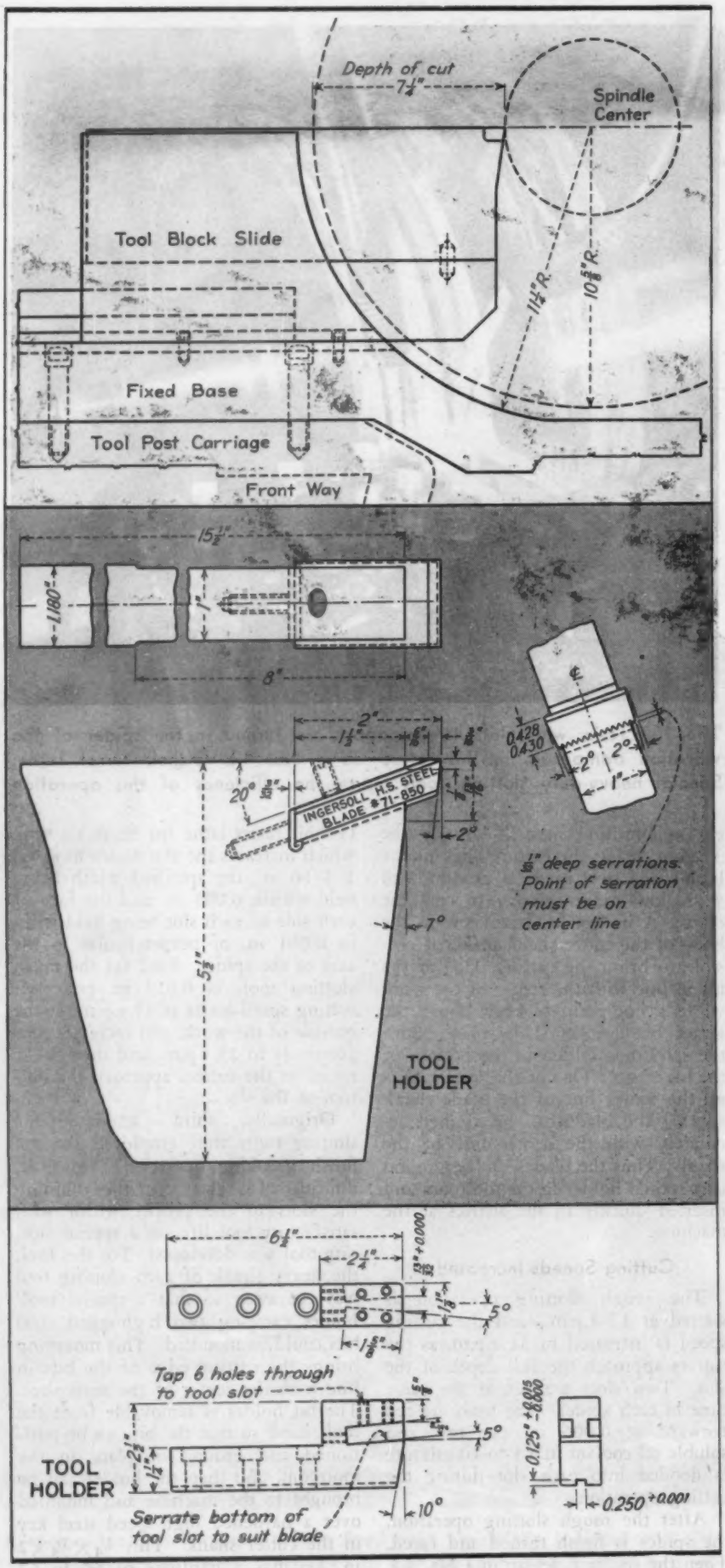
The spiders are slotted in two operations on separate No. 4-L turret lathes. In the rough slotting operation, two 1⅛-in. wide slots are turned 7¼-in. deep. Originally, the heavy slotting blades used for the roughing and finishing cuts were tipped with tungsten carbide. However, difficulty was experienced when cutting these deep slots with carbide tips, and a new rough slotting blade was devised. Here, the tool body is made of SAE 1095 steel, hardened and ground all over. It is machined at the forward end to hold a 1⅛-in. wide Ingersoll high-speed steel No. 71-850 milling cutter blade. This satisfactory design permits use of used blades for inserted-tooth milling cutters. Usually, the 3/16-in. lip at the cutting edge of the high-speed steel blade is ground with a shallow radius groove to curl the chips. A hollow-head setscrew in the body of the cutter shank makes it possible to bring the cutting edge of the bit in line with the center of the work while a dog-point setscrew above the cutter blade locks it in place above the serrations milled in the bottom of the blade slot. One of the serrations is on the center line of the blade shank so that the blade can be aligned accurately with the center line of the shank. Thus the blades can be ground in a special holder in the toolroom and inserted quickly in the shanks at the machine.

Cutting Speeds Increased

The rough slotting operation is started at 17 r.p.m., and the cutting speed is increased to 31 r.p.m. as the cutters approach the full depth of the slot. Two slots are cut at the same time in each spider. The tools are fed forward at 0.006 in. per rev. and soluble oil coolant in a 1-to-10 mixture is flooded into each slot during the cutting operation.

After the rough slotting operation, the spider is finish turned and faced. Then the spider is set-up in a No. 4-L Gisholt turret lathe for finish slotting, which increases the slot width to about 1 3/16 in., the specified width being held within 0.005 in. and the face of each side of each slot being held within 0.001 in. of perpendicular to the axis of the spider. Feed for the finish slotting tools is 0.012 in. per rev.; cutting speed starts at 17 r.p.m. at the outside of the work, and increases progressively to 23 r.p.m. and then to 31 r.p.m. as the cutters approach the bottom of the slot.

Originally, solid carbide-tipped slotting tools were employed for the finish grooving operation. However, difficulty was experienced in holding the slots to the proper width with satisfactory tool life, so a special slotting tool was developed. For this tool, the heavy shank of each slotting tool was cut away so that a special toolholder carrying two high-speed steel bits could be mounted. This mounting brings the cutting edge of the bits in line with the center of the workpiece. The bit holder is removable from the tool shank so that the bit can be positioned and ground in place in the toolroom, and then the holder can be brought to the machine and mounted over a hardened high-speed steel key in the cutter shank. This ¼×⅜×2 in. key has a hardness of 60 to 62



Rockwell C. Each tool bit has a ⅛-in. radius and the bits are positioned and adjusted to give a cutting width of 1.186 in., plus or minus 0.001 in.

Satisfactory application of the rough slotting tool led to the development of a finish slotting tool which makes use of used blades for inserted-tooth milling cutters. These blades are ground to fit the holder, which has serrations in the bottom of each of the tool slots. The serrations are milled in the same position in the blade slot of the tool holder as are the serrations in the bottom of tool slots in a grinding fixture used in the toolroom. The holder is likewise removable from the shank of the slotting tool so that the blades can be positioned and clamped in the toolroom to cut a slot 1.186 in. wide within the limits allowed.

The slotting tools have proved so satisfactory for these heavy slotting operations that it is expected that similar tools using scrap milling cutter blades will be found economical for heavy turning and facing operations.

Eight holes must be drilled and bored in the three flanges of the spider for the vibration dampener. These holes are for hardened and ground steel bushings which support the pins upon which the counterweights are mounted. The diameter of each of these holes must be held within 0.001 in. and each of the holes must be within 0.002 in. of the proper location. A precision boring machine was designed specially for finishing these holes after they have been drilled through the three flanges in a radial drill press. The drilling operation

The various elements of the special cross-slide for the slotting operation on vibration dampener spiders are indicated in the top sketch. Originally, the slotting tools were tipped with carbide

The slotting cutters for the roughing operations were improved through a new design (center). This makes possible the use of a stock of used blades for inserted-tooth milling cutters which otherwise would have been scrapped, and produces an efficient slotting tool

This improved toolholder for the finish slotting operation makes it possible to use blades from inserted-tooth milling cutters. This unit can be removed and taken to the toolroom for setting the blades in position

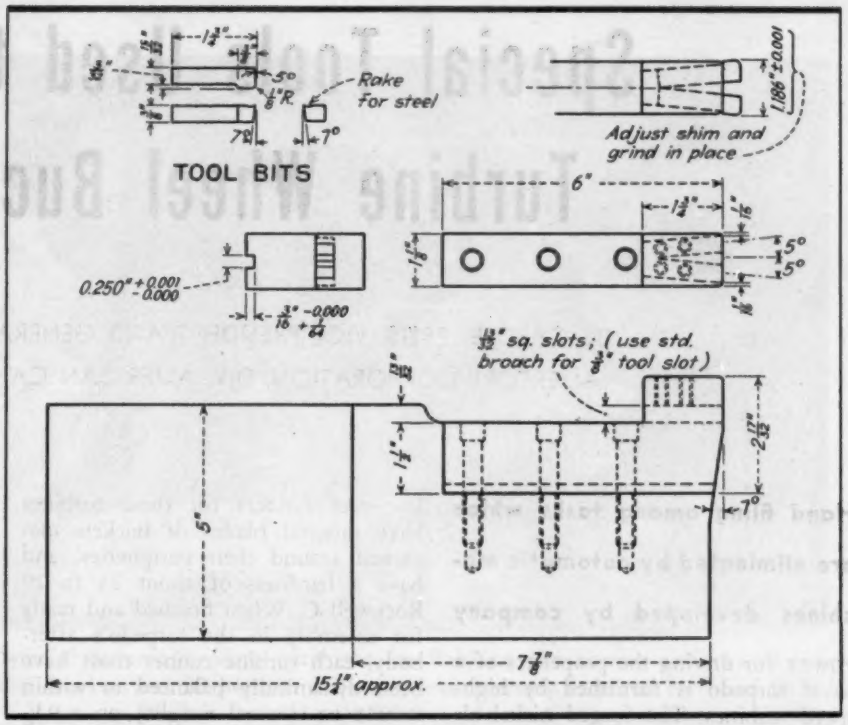
leaves 0.020 in. of stock on the diameter of each hole for the finish boring operations.

This machine has a special base which, for economy reasons, is mounted on two sub-tables from radial drill presses. The carriage carries a Barber-Colman hobbing spindle with a special extension in which is mounted two boring bits. The first bit is tipped with tungsten-carbide and the second carries a diamond for finish boring. The tungsten carbide bit leaves about 0.001 in. stock for removal by the diamond. This tool arrangement makes it possible to hold the 2⅝-in. hold diameter without difficulty. A 1-hp. motor drives the spindle at 800 r.p.m. while a ¾-hp. motor drives the carriage feed screw at a feed rate of 0.003 in. per rev. The three holes through the plates must be in line so that bushings later shrunk into these holes will align within 0.001 in.

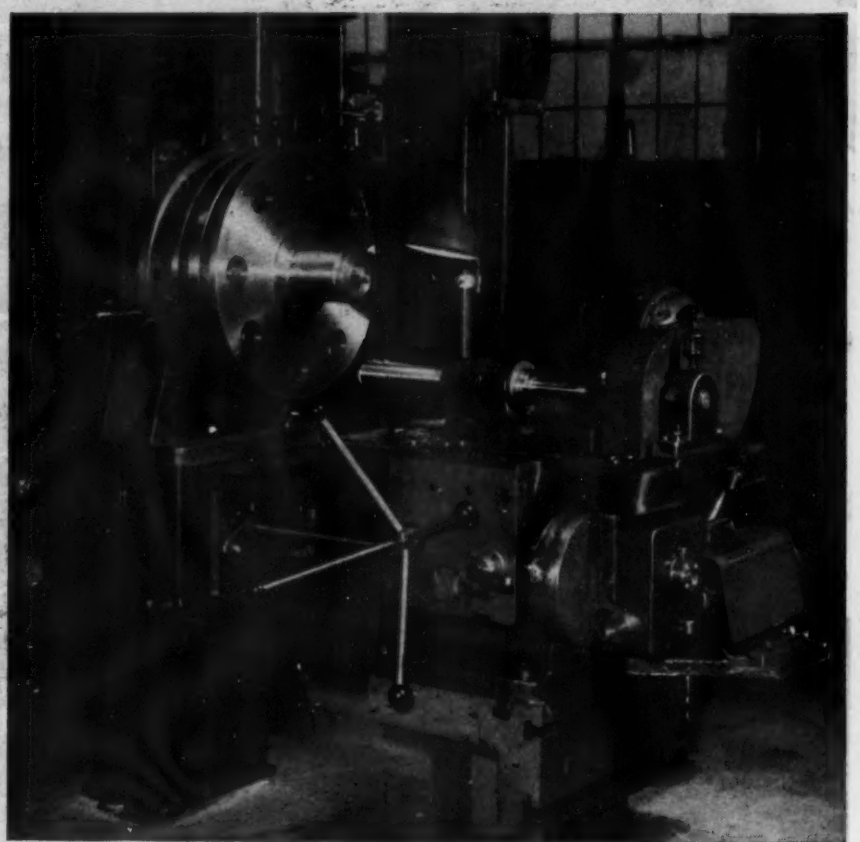
Counterweights Used

Counterweights for the torsional dampener are cut from turned and bored steel rings which are burned from plate stock and then heat-treated before machining. These plates, cut close for economical use of material, hardly retain enough stock to permit machining, so the rings are split before finish machining the sides, in order to cut the warpage in one piece to about one-fourth of that in the entire ring. A high-speed steel end mill is used for this slotting operation in a Milwaukee Model K vertical milling machine. The set-up was adopted because slitting cutters are hard to get, and use of end mills reduces materially the amount of tool steel required for the job. The work is held on a 24-in. diameter rotary index table having a large plate fixture mounted on its face to permit clamping the 22-in. diameter ring. The 1⅜-in. diameter end mill is rotated at 177 r.p.m. and the work is fed at 1 to 1½-in. per min. past the cutter. The slotting operation is done in two cuts, using a small diameter end mill for the roughing cut and a full diameter mill for the finishing cut. When the finishing cutter becomes dull and it is ground down below the diameter required for the finishing operation, it is used for the roughing cuts.

Two 2⅝-in. diameter holes are drilled and bored in each counterweight. A 3-ft. arm Cincinnati-Bickford radial drill uses four tools for finishing each of the tool holes. First, a 1-in. diameter drill is used, then the hole is enlarged with a 2½-in. drill, and finally the hole is rough and finish reamed with 2⅝-in. six-flute inserted-blade Gisholt reamers.



This finish slotting cutter unit employs ⅜-in. square high-speed steel toolbits in a special holder which can be removed and taken to the toolroom for grinding and setting the bits to proper width



This special horizontal boring machine carries a tungsten-carbide tipped bit and a diamond bit in the same bar for finishing eight 2⅝-in. dia. holes in each of the three flanges of the dampener spider. These holes must align within 0.001 in., must be spaced within 0.002 in., and must be within 0.001 in. of the correct size

Special Tools Used to Cut Turbine Wheel Buckets

BY CARL G. PREIS, VICE PRESIDENT AND GENERAL MANAGER
AMERTORP CORPORATION, DIV. AMERICAN CAN COMPANY

Hand filing among tasks which are eliminated by automatic machines developed by company

POWER for driving the propellers of a naval torpedo is furnished by high-speed turbines. The forged nickel alloy steel runners for these turbines have integral blades or buckets machined around their peripheries, and have a hardness of about 25 to 29 Rockwell C. When finished and ready for assembly in the torpedo's afterbody, each turbine runner must have been dynamically balanced to within 0.0045 oz. (actual weight) on a 9⅜ in. diameter. In addition, the width of the wheel must be held within 0.0005 in. of the specified size. These limitations, of course, mean that considerable care must be exercised in all of the necessary machining operations.

The turbine wheels are formed turned and faced to within 0.0005 in. of the required dimensions in stand-

Six cam-controlled cutters shape the front and back surfaces of each bucket on a turbine wheel in this machine. Indexing between cuts is automatic

ard 16-in. American engine lathes, using high-speed steel tools. When the outside diameter is form turned, two circumferential ridges are left on the periphery. These ridges are milled in a Gould & Eberhardt gear cutter to form two rows of rivet projections around the periphery of the wheel. Rivet projection dimensions must be within 0.002 in. for width, within 0.001 in. for thickness, and within 0.005 in. for height. Two 4-in. diameter ¼-in. wide straddle milling cutters are used when milling these rivet projections. The cutter spindle is rotated at 77 r.p.m. and it is fed at the rate of 5⅓ in. per min. past the work. A flywheel on the cutter arbor helps insure a smooth cut. The wheel is indexed automatically between cuts.

Bucket Contours Slotted

Bucket contours are formed in special turbine wheel slotting machines built by the American Can Company from designs furnished by the U. S. Navy. As shown in an accompanying illustration this machine consists of a cam-fed horizontal slide having a vertical spindle upon which the turbine wheel is mounted. In front of this slide is a horizontal spindle carrying six cam-controlled high-speed steel shaped cutters which machine the slots between the bucket projections on the wheel. Three of these cutters are set to machine the concave surface at the front of the blade, while the other three cutters machine the convex surface at the back of the blade. These six cutters all pass through the same slot, so that the front of one blade and the back of the adjacent blade is formed during one operating cycle. Indexing between cuts is automatic. The blade slots are machined to leave two rivet projections in the center of each finished blade. Blade spacing tolerance is very small, so indexing must be accurate.

Convex Surfaces Must Be Filed

It is necessary to file the convex (back) surfaces of each turbine wheel blade. Originally, this was done by hand, but it is now done in special filing machines developed and built by the American Can Company. It is estimated that these machines have saved approximately one-half of the time formerly required for hand filing buckets. Two file blades are used in each of these machines, so that both sides of the back surface of a bucket are finished at the same time. These files are carried on slides operated by a series of cams. Indexing between blades is automatic. The work is flooded with kerosene during the filing operation in order to wash away the chips.

Special automatic filing machines for finishing the convex surfaces of turbine buckets cut 50 percent from the time formerly required for hand filing. Work is flooded with kerosene to wash away chips

A hand-indexed fixture permits rapid riveting of shroud segments at the end of each blade on a turbine wheel. Six operations are necessary to head each pair of rivets

These rivets are headed to hold the shrouds in place, using a High Speed Hammer riveting machine with a special hand-indexed fixture to hold the turbine wheel during the riveting operation. The rivets are headed in a series of six operations, with the reduction in each of these operations being approximately the same, so that the rivet heads are not upset too rapidly. Four sets of punches are used to head the rivet to the required shape.

After the buckets have been filed, the wheels are carefully inspected, and then shroud plates are assembled over the rivet projections on each bucket.

Next, the turbine wheels are finish machined in a series of lathe and grinder operations where the buckets are faced to width, the shroud segments are chamfered and the bore of the wheel is ground. Finally, the keyways in the bore are broached and the entire wheel is polished by hand. Final inspection includes checking to insure

dimensional accuracy and balancing in a Tinius Olsen dynamic balancing machine. After balancing, each wheel is given an overspeed test at 19,000 r.p.m. in a special vertical-spindle unit which drives with an air jet at 2,800 lb. per sq. in. pressure for ½ min. after full speed is attained. The overspeed test unit has a cast-iron pot with 1½ in. walls.

Although the combat life of a torpedo is comparatively short, accuracy built into it is necessary to assure maximum effectiveness of the weapon. While hand finishing could provide acceptable accuracy, such special purpose tools as these were necessary to provide suitable speed of production.

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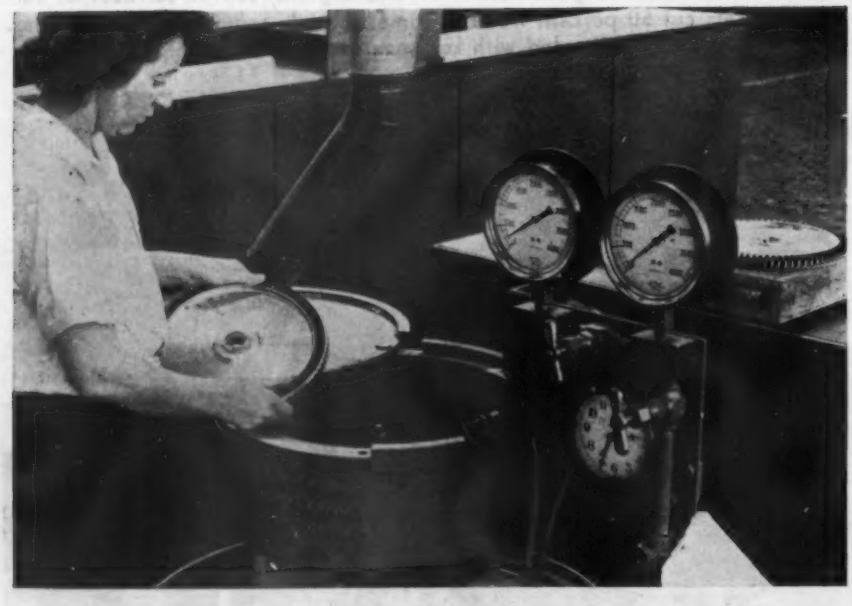
Each turbine wheel is dynamically balanced in a Tinius Olsen machine. Precision balancing is necessary to insure smooth operation of the torpedo drive assembly



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An overspeed test is part of the final inspection procedure for finished turbine wheels

Lapping Coolant Suggested for Wartime Use

BY RALPH WOODWARD, GRINDING MACHINE DIVISION, NORTON COMPANY

BECAUSE of war conditions it is difficult to secure a uniform quality of kerosene for use as a coolant in mechanical lapping operations on critical material. A mixture of mineral seal oil and a modifying agent has been used with considerable satisfaction. The latter is usually a compound marketed by certain vendors under trade formula, for example, International Chemical Company's No. 155. Five gallons of modifying agent are used to 55 gallons of mineral seal oil.

The quality of the modifying agent should be such that no free acids are present, because an acid condition may increase the propensity of the work to rust. Likewise the mineral seal oil should contain no free acid.

Hydrogenated castor oil may be used instead of a proprietary modifying agent for compounding with the mineral seal oil. The proportions are the same: 5 percent and 95 percent, respectively.

The term "mineral seal" is not used universally. The oil is one cut above kerosene and has a flash point of approximately 300 F. and a viscosity of between 42 and 50. Sometimes, the oil is called "white spirits" by plants.

Care must be taken to assure suitability of any light oil of this character with respect to mechanical lapping operations. The recommendations are made without assuming responsibility because it is impossible to control the quality of commercial oils. It must be remembered that much rusting is caused by fingerprints which are not neutralized by immersion in kerosene or like oils. Cleanliness of the coolant is also important to good lapping. Many of the impurities are removed by a Hoffman-type filter.

Taking Tools to Heavy Work By a Jib Crane

BY J. I. KARASH, PLANT ENGINEER
RELIANCE ELECTRIC & ENGINEERING COMPANY

Many parts to be machined in this plant were too heavy to handle by hand so a jib crane was designed whereby the spindle could be positioned to the work

DRILLING AND TAPPING motor brackets for hand-hole covers constitutes a special production problem because the range of varying cover requirements makes this a tailoring operation. Specifications may call for top half or bottom half covers, special covers, or fully enclosed brackets and as quantities are usually limited the machining becomes even further removed from the production-line category.

Our solution has been to make such drilling and tapping the final operation on standard machined bracket castings supplied from stock. An extremely maneuverable drill press structure was built to help cut costs on this special tailoring by substantially reducing time-consuming handling and positioning of the heavy castings, as shown in Fig. 1. Electrical controls were provided so that the proper drilling, tapping and tap reversal speeds were instantly available to the operator, so as to reduce machining time to a minimum.

Meets Seven Requirements

This drilling machine has proved so useful and flexible as to cause consideration to be given to its application in a variety of operations. Specifically there were seven considerations underlying its design and construction:

1. The drill spindle to be available over a large working area.
2. Parts being drilled were too heavy to handle by hand, and it was desirable to be able to position the drill spindle to the work, rather than the work to the spindle.
3. Provision for swinging the drill head clear of the work, to permit crane handling of the parts.
4. It was desirable at times to tap each hole immediately after drilling, to avoid repositioning of the drill head or the work.
5. Instant speed changes and quick reversals were essential to efficient drilling and tapping.
6. A relatively high speed available for quick tap withdrawal.
7. The holes to be drilled and tapped (in mild steel) were ⅜ in. in diameter, but there would be occasional requirements to drill holes up to 1 in. in mild steel, and to ¾ in. in cast iron.

The jib crane type drill press built to meet these work requirements was designed to fit a specific location in our plant. Its proportions and mechanical detail, however, will undoubtedly be of interest to anyone with a similar drilling problem. There are four basic components, the jib crane, the drill head, the drive, and the electrical control.

Rigid But Easily Movable

The jib crane, or drill head support, is essentially a rigid cantilever type. The vertical member is a standard 8-in. I-beam, boxed in with 5/16-in. plates. The greatest stress in this boxed-in member is across the strongest section.

The horizontal cantilever arm is also a standard 8 in. I-beam. It is further strengthened by the addition of a triangular ½ in. web plate and a ½ × 4-in. flange. Secured to the underside of the cantilever arm is a ¾ × 5-in. cold rolled steel plate, which provides a accurate track for the drill head bearing wheels.

Welded to the top and bottom of the vertical member are standard punch holders from a commercial postless die set. The shanks of the punch holders fit into two spherical self-aligning roller bearing units. It is of paramount importance that the bearing units be self-aligning, otherwise a binding action would no doubt occur.

This type of jib moves very easily, and therefore must be erected very accurately if jib drift is to be avoided. The centers of the bearing units must be perfectly aligned, regardless of the variations in the crane itself. This is achieved by dropping a precision plumb bob from the center point of the upper bearing plate to the opposing bearing plate in the floor. The lower bearing plate is concreted in place in the aligned position.

The drill head unit has elevating mechanism. The trolley unit is a cradle assembly. The lower collar was dowled to the drill column to make sure that the drill head would not accidentally drop off. Similarly the trolley chassis was doweled to the drill column to make sure that this also remained secure. A set of slip chuck sleeves and collets were provided to facilitate the quick interchange of drills and taps. A d.c. motor was installed as part of the variable speed drive.

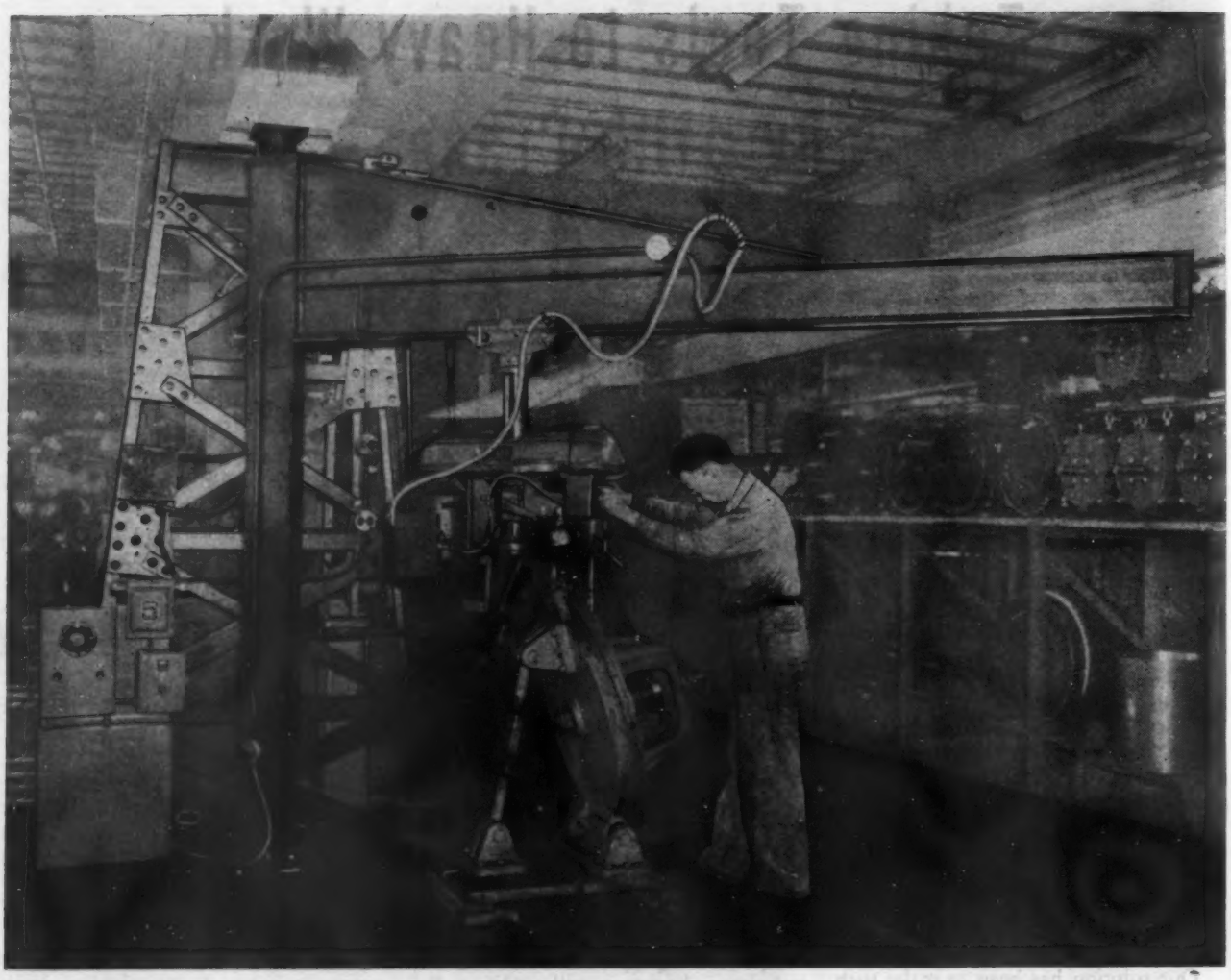
Cone pulleys were replaced with multiple belt sheaves, using three belts. Two belts would undoubtedly have been sufficient to do the job, but inasmuch as space was available for them, three belts were used to insure abundant capacity for tapping at very low speeds.

The pulleys used were 3L-46 and 3L-80, giving a ratio of 1 to 1.73. It was necessary to provide adapters to fit these sheaves to the spindle. The sheaves fit within the cast iron belt guard provided with the drill head.

Complete Electrical Control

The electrical control for the drill press is a Reliance unit, which operates on the regular a.c. plant power to provide a wide range of speeds in a d.c. drill head motor. Smooth, even starting is made possible without a clutch arrangement and reversal is provided for tapping operations.

Two selector switches mounted on the drill head permit a choice of op-



The tool head of the jib crane is moved to the work, instead of the work being moved to the tools, eliminating much manual labor particularly when the parts are heavy

erating speeds from the pre-set rheostat. One switch is the "drill-tap" selector, and effects a rapid change from the higher drilling speed to the lower tap r.p.m. and back again. The second switch controls forward, stop, and reverse motions of the spindle; a second rheostat mounted at the rear of the control unit provides a high "reverse" speed for rapid tool removal for tapping operations.

Speed control rheostats could be mounted on the drill head if a number of different drill sizes were being used and a variety of speeds were desired. In this application speed changes are infrequent and mounting on the control unit is more economical.

Gage Acceptance Clinic at Frankford Arsenal Eliminates Many Rejections

ONE of the objectives of the Frankford Arsenal gage laboratory is to supply government inspectors with gages that will insure acceptance of equipment and material that will function. The emphasis on the responsibilities of the laboratory is to accept gages within the limitations of the above objective. A high gage rejection rate retards inspection and final acceptance of material.

Under the impetus of a program 2,000 to 3,000 percent over normal, it is an easy matter to lose sight of the objective. Under such pressure personnel may easily develop a negative or rejection complex. The realization that this phenomenon was developing in the laboratory was responsible for the creation of the gage acceptance clinic.

The clinic operates as follows: All gages that would result in the acceptance of defective components are rejected, although some gages that would reject a few components which are near the allowable limits may be accepted. The clinic insures that proper consideration is given to the limitations of accuracy, of equipment and of personnel. The clinic authorizes simple corrections which can be made in the small salvage shop at the laboratory, where the urgency justifies such action, or where the cost of the correction would be less than the cost of rehandling and reinspection after the rejection.

During the several months that the clinic has been in operation it has demonstrated that it has fulfilled a valuable purpose in prosecution of the war.

Incombustible Lubricant Used In High-Pressure Compressors

BY RAYNAL W. ANDREWS, ALUMINUM COMPANY OF AMERICA, AND
E. M. KIPP, ALUMINUM RESEARCH LABORATORIES

LOCALIZED OVERHEATING of compressors in operation for long continuous periods presented an explosion hazard which has been eliminated through investigations made by the Aluminum Company of America.

Increased leakage of air through the valves and past the pistons causes the localized overheating, which often reached temperatures in excess of the flash and fire points of the best mineral oils. The presence of oil, oil vapor, or a mixture of oil fractions in the discharge lines and receivers combined with oxygen to support combustion need only be ignited by a small particle of hot carbon to create a serious explosion.

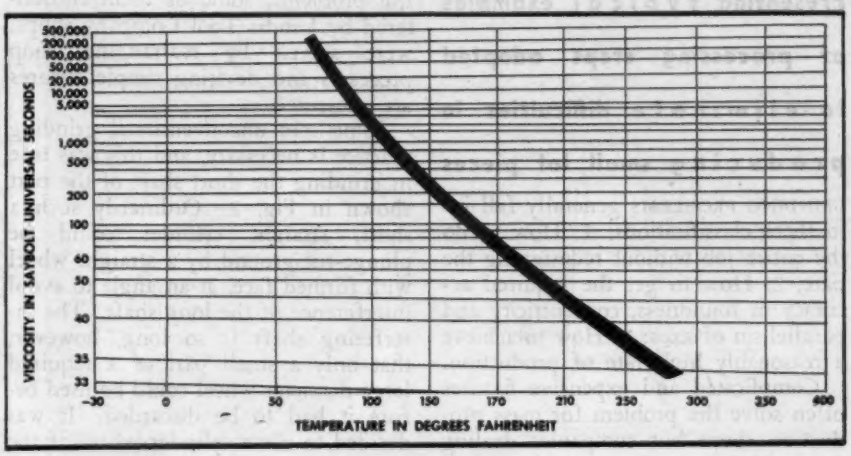
The possibility of replacing air with an inert gas, such as nitrogen, was abandoned as too costly and difficult from the angle of supply.

Analysis indicated that removal of all combustible material, such as air compressor oil, would solve the problem. Intensive study of organic compounds having a high boiling point led to the tentative selection of a group of phenyl compounds containing a wide range of substituted chlorine in the phenyl groups. Known as Aroclors, these products vary in character from thin, combustible oil substance to an incombustible plastic solid.

One of the group known as Aroclor 1254 has neither flash nor fire point and is a liquid at room temperature. Its physical data include:

Form	Yellow-tinted viscous oil
Flash Point	None (Cleveland open cup)
Fire Point	None (Cleveland open cup)
Pour Point	46 to 54 F. (ASTM)
Viscosity (Saybolt Universal Seconds)	210 F., 43.5-48.5 130 F., 280-400 100 F., 1,800-3,800

Lubricating characteristics of the material were compared with those of a number of standard-type mineral oils widely used as air compressor lubricants. Tests indicated that the material could withstand considerably higher applied bearing loads than the mineral oils before failure of the test-bearing piece occurred. Wear-rate characteristics of the material, with a variety of leads and running times, were superior to those of the mineral oils. Oxidation stability and gum-forming characteristics were determined by heating samples to temperatures of 100, 210, 350 and 500 F., in conjunction with steel, copper, brass and aluminum.



The viscosity characteristics of the organic lubricant known as Aroclor 1254, which is one of a group of phenyl compounds varying from a thin combustible oil substance to a non-combustible plastic solid

The samples, in contact with the different metals, were held at high temperatures for periods of from six to twelve hours during which a current of air, saturated with moisture, was bubbled through the liquid. No evidence of the formation of hydrochloric acid was found except at temperatures of 350 and 500 F. No sludge was found in the material itself, although at temperatures of 350 and 500 F. some black, gummy sludge formed on the surface of each of the metals. At 350 and 500 F., the amount of oxidation and gas formation was far less than was evident when mineral oils were used under parallel conditions.

The field tests indicated the necessity of procuring a special lubricator, and thermostatically controlled strip heaters for the lubrication suction tank to insure flow of the material through the inlet ports of the lubricator pumping units. More than 15 high-pressure compressors of various types have been equipped for lubrication with this material and they have given satisfactory service. Experience indicates that the material should be used sparingly. Rate of feed should be comparable with the best practice for mineral oil lubrication.

The material's viscosity characteristic introduces an operating problem in cases where room temperature falls appreciably below 70 F., although a properly selected lubricator should pump the material in the more viscous state as long as the suction tank is heated to insure the filling of the lubricator cylinders. Dilution with lighter liquids should be reserved as a last resort, as it adversely affects the non-combustible properties of the resultant mixture.

While explosions of air-hydraulic accumulators have been few in number, they have been devastating in effect. The fact that air compressed to 4,500 lb. per sq. in. weighs approximately 23.5 lb. per cu. ft. indicates a concentration of oxygen sufficient to support the combustion of a substantial quantity of ordinary compressor oil. Test results have produced a lubricant without flash of fire points to eliminate the threat of explosions.

Grinding Problems Overcome By Revision of Shop Practices

BY J. S. STEINER, PLANT MANAGER, AND S. H. NEADY, ASSISTANT CHIEF ENGIINEER, LANDIS TOOL COMPANY

Presenting typical examples of processing steps adopted to eliminate difficulties in producing small lot pieces

GRINDING PROBLEMS generally fall into three classifications: 1. How to do the entire job without redesigning the part; 2. How to get the required accuracy in roundness, concentricity and parallelism of axes; 3. How to achieve a reasonably high rate of production.

Complicated and expensive fixtures often solve the problem for mass production shops but companies dealing in small lots, such as machine tool manufacturers, prefer to find the answers by using available equipment. Often careful study of the problem results in arriving at a method of accomplishing the task by using standard grinding equipment, or by obtaining a simple, inexpensive fixture

The manner in which several grinding problems, some of them encountered by Landis Tool Company shops, were solved by rearranging shop processes and devising simple fixtures are presented.

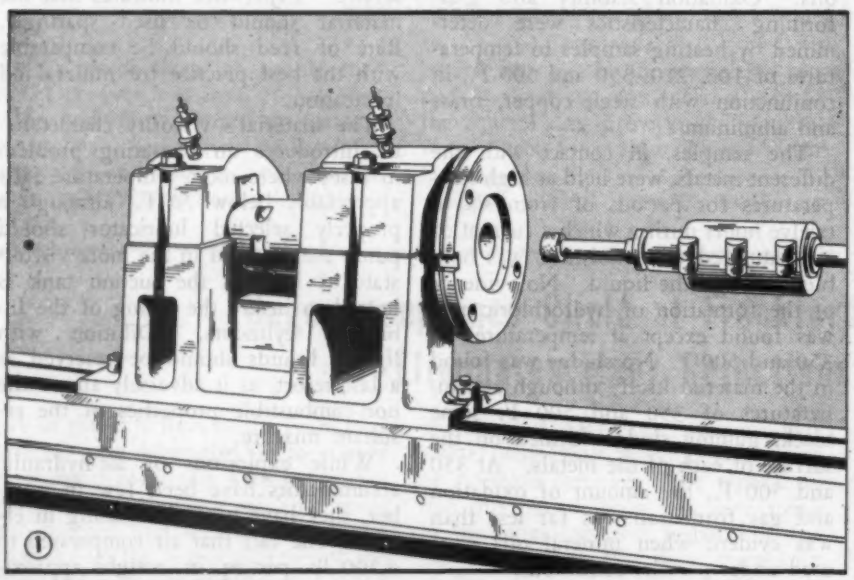
Sometimes unconventional grinding practice is necessary, and this was true in grinding the short shaft of the part shown in Fig. 2. Ordinarily such a short, straight cylinder could be plunge-cut ground by a straight wheel with formed face, at an angle to avoid interference of the long shaft. The interfering shaft is so long, however, that only a small part of a required large diameter wheel could be used before it had to be discarded. It was decided to use a cylinder wheel of the type chiefly used for surface grinding. The wheel was formed on the shape shown and the outside piece was ground with the inside of the wheel, which amounts to internal grinding in reverse.

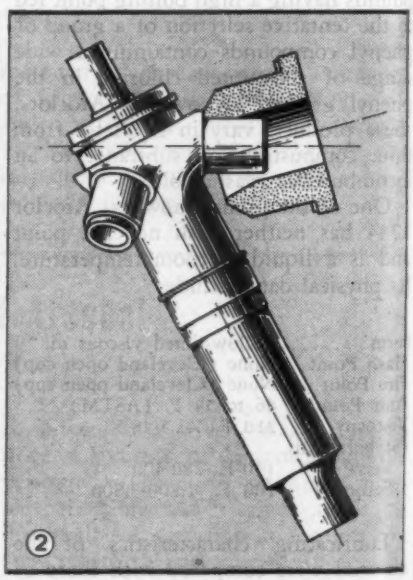
Another problem arose, however, when there was danger of burning the work because the coolant was being absorbed by the wheel and an insufficient amount was reaching the point of contact of the wheel and work. This was overcome by applying a coating of sulphur to the inside of the wheel not in contact with the work and the outside of the wheel.

When a part is to be ground both externally and internally, the job is usually done on a universal grinder. But this could not be accomplished on a heavy crankpin grinder spindle as the universal machines available were not large enough. A plain 18-in. machine was used.

It was necessary that the spindle surfaces be parallel, concentric and at right angles within 0.0002 in. At first the spindles were ground internally by chucking one end and supporting the other end in a steadyrest located at the right-hand bearing end. Difficulty was experienced in obtaining the required tolerance.

Experiments proved that it was better to support the spindle on its own bearing surface after the external grind-





1—When no universal grinder of sufficient size was available a heavy grinder spindle was first ground externally and then supported on its own bearing surface for greater accuracy and ground internally

2—Grinding the outside diameter of this short cylinder on the inside of the wheel made it possible to overcome interference of the long shaft and is an example of internal grinding in reverse

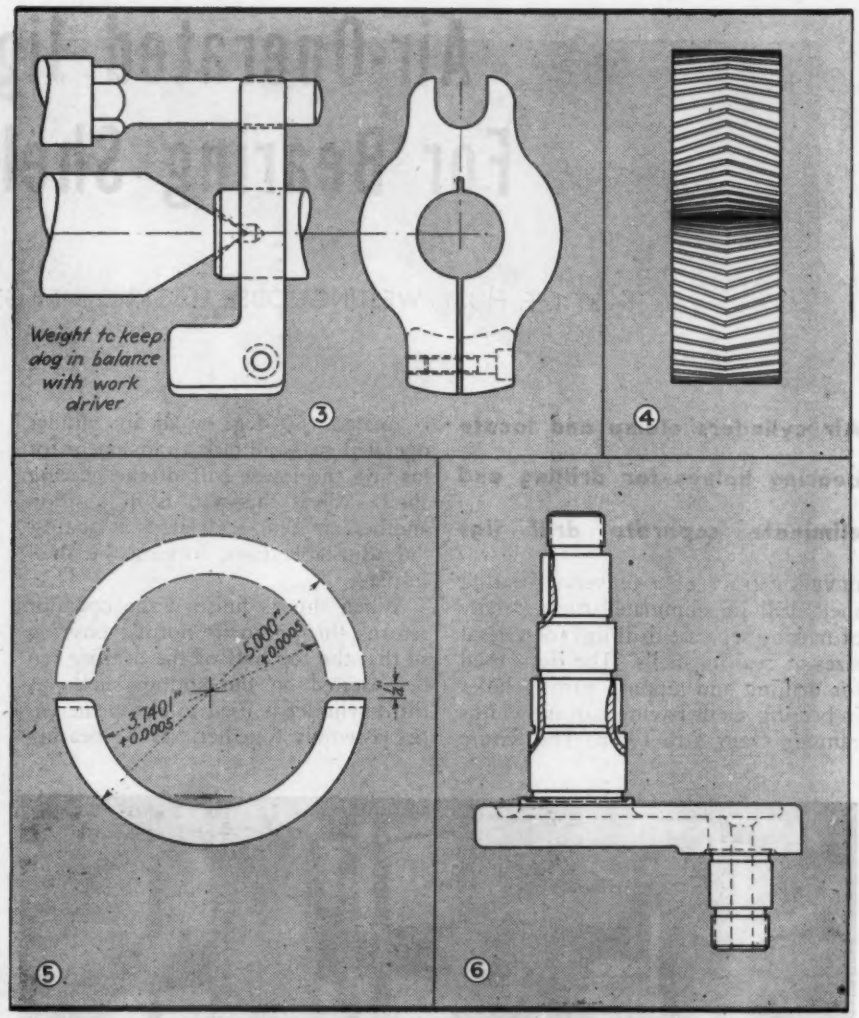
ing operations had been done between centers. The fixture for this internal operation is mounted on the table, using the headstock as a driver. The spindle rides in the fixture on the bearing diameters which have been ground externally. An internal grinding attachment is mounted on the regular plain grinder. Greater rigidity and power of the plain grinder and the more rigid way of holding the heavy part gave a greater degree of accuracy in straightness and concentricity than by any other method. The process resulted in increased production and parts of better quality.

Long, slender pieces which have to be ground externally often cause trouble. Pressure of the wheel and of the center points tends to bow the work somewhat, causing it to be ground out-of-round. Correction from a grinding standpoint did not eliminate the condition. Further study revealed that the grinding dog was not in balance, and set up a whipping action which bent the piece. An inexpensive balanced drive dog was built and the condition was solved satisfactorily.

Despite the dependability of modern locating and indicating methods, it is generally best to grind parts together instead of separately if they must have an exact relation to each other. Take, for example, two herringbone pump gears which have sides exactly parallel and must be of exactly the same thickness in tolerances of plus or minus 0.0000. They could not be ground separately in a reasonable time. The obvious solution was to mesh the gears and grind both sides simultaneously on a universal machine.

Parts similar to a split-bearing bushing are common enough in many shops. A 50 percent loss in rings was experienced, however, by using the method of rough and finish grinding the inside and outside diameters of the whole ring, then hardening it, and finally cutting it in two along a diameter. When cut, the half rings would spring out from 0.001 to 0.002 in., and had to be discarded without salvage possibilities.

The springing was caused by stresses set up in heat-treating the rings. The fact that grinding operations had already been completed left no room for correction. The process was revised by milling about half-way through the ring, then heat-treating and rough grinding the two sides and the inside and outside diameters. An abrasive wheel severed the two halves at the points partly cut by milling. All surfaces were then finish ground with the parts held in fixtures. Finish grinding corrected any springing.



3—Out-of-round grinding of long, slender parts was attributed to whipping caused by an unbalanced drive dog. An inexpensive balanced drive was built to correct the condition

4—In order to meet the requirement of no tolerance, it was found that considerable time could be saved by meshing herringbone pump gears and grinding them in pairs, instead of singly

5—Finish grinding of split-bearing bushings, after heat-treatment, instead of before, has eliminated the 50 percent loss formerly experienced

6—The long leg of an operating crank is ground between centers and then shifted to a faceplate and the short leg ground, which insures parallel axes

There was no trouble in keeping the diameters within required tolerance of plus or minus 0.0005 in. The material used was Stentor tool steel and the job was performed on a universal machine.

A part is generally ground between centers if possible. This is not always feasible, however, if great accuracy in alignment is essential because any inaccuracy in the machine centers or the center holes in the work will show up in the finished piece.

If the part shown in Fig. 6 is allowed ordinary tolerances it could be ground between centers if the points and center holes are kept reasonably accurate. In fact both legs of the operating crank were so ground at first, one after the other. It was impossible, however, to keep the center lines of both legs absolutely parallel. The out-of-balance character of the piece was not at fault. Inability to get accurate center holes caused the difficulty. The practice was changed so that the long leg is ground between centers with great care to insure that the work does not get out-of-round. The piece is then transferred to a face-place which holds it by the previously ground long leg while the shorter leg is ground. This insures that the axes of the two legs will be parallel.

Air-Operated Jig For Bearing Shells

BY I. F. HUEY, WESTINGHOUSE ELECTRIC & MFG. COMPANY

Air cylinders clamp and locate bearing halves for drilling and eliminate separate drill jigs

DEVELOPMENT of a universal bearing shell drill jig eliminated the necessity of making separate drill jigs for several sizes of bearing shells. The jig is used for drilling and tapping parting holes in bearing shells having parting widths ranging from 3 to 14 in. The fixture is rotated 180 deg. by an air-cylinder operated gear and rack arrangement for loading the lower half of the bearing shell. When this part is in position another air cylinder clamps it against the adjustable jaws, locking the shell in place.

When this is finished the operator returns the jig to its normal position so that the top half of the bearing can be inserted on the bottom shell. A third cylinder is used to clamp the entire assembly together. These bearing shells have been standardized so that there is the same size of step between the upper and lower shells. One setting of the jaws is sufficient for a production run on a given size of bearing, the operator having only to line up the end faces for correct alignment.

The control valves for the three air cylinders are at the right-hand end of the fixture. The air cylinder which pushes the bottom casting upwards is twice as large as the cylinder holding down the upper shell, in order to provide resistance to the drilling pressure. Layout has been eliminated by the use of punches having the same diameter as the cored recesses in the castings.

Formerly a keyway at the parting surfaces was used to keep the two halves of the bearing in position. Bolts now are used to clamp the bearing halves together and to act as dowels to maintain alignment. Holes are tapped through both top and bottom casting lugs, and then the assembly is taken apart to babbitt the two halves separately. After babbitting, a clean-up cut is required on each of the parting faces, leaving a 1/64 in. gap between the shells when they are bolted together. The top and bottom halves of the bearing are clamped together in a vertical position, and then the holes are retapped from the bottom side. This leaves, in the top half, a thread that has lost about 1/64 in. of its lower face, the pitch diameter not being changed. This looseness on the lower face of the thread allows the two halves to be pulled tightly together, while the fullness on the pitch diameter of the bottom face of the thread acts as a dowel pin to keep the bearing halves in perfect alignment.

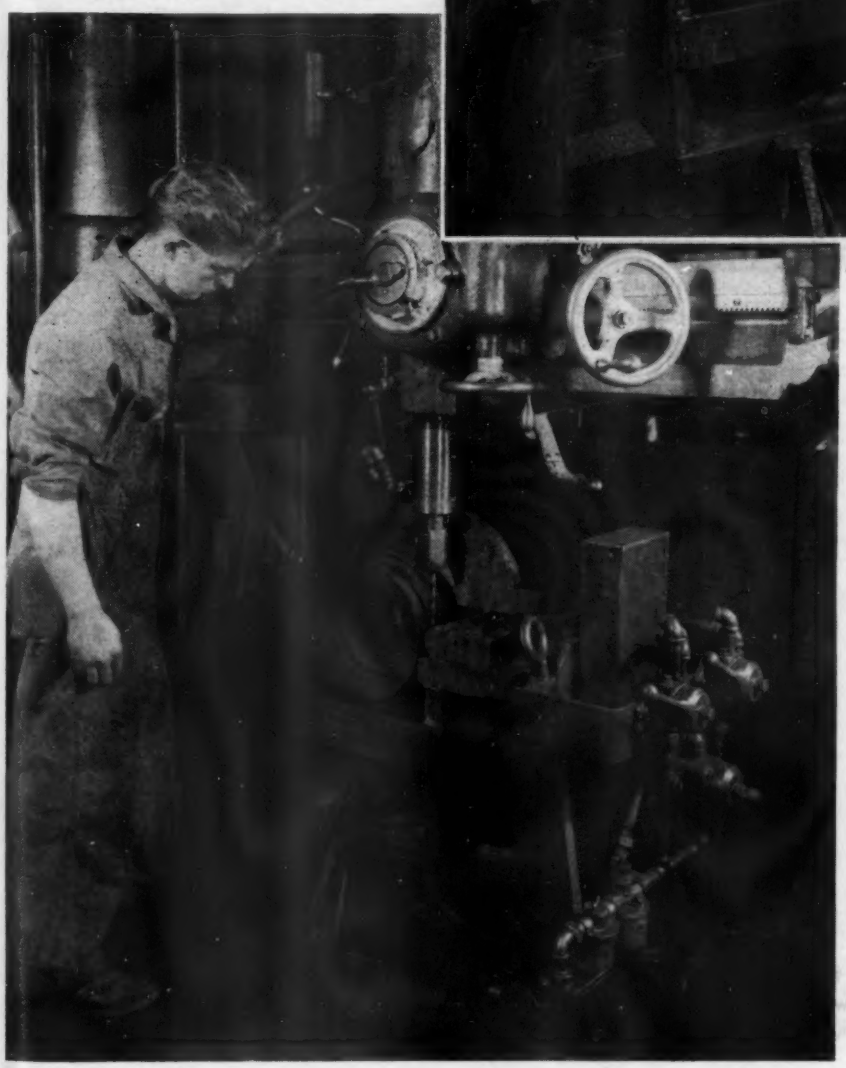
The main frame of the jig is a welded steel assembly mounted on a 24 × 59½ × 2 in. steel baseplate.

When the lower half of the bearing shell has been locked in place, as shown, the operator moves an air valve to return the jig body to the drilling position

With the lower half of the bearing in position, the operator inserts the top half and then uses a third air-cylinder to clamp the entire assembly together

This frame supports the jig body between trunnion bearings, one of which has an extended shaft for the pinion which is rotated by a vertical rack fixed to the end of the piston rod of the 8 × 7 in. air cylinder mounted vertically on the baseplate. When in drilling position, the jig body is swung down against the stop on the baseplate. This assures positive angular alignment of the work with the drill spindle.

When setting up to drill a given size of bearing shell, the two adjustable jaws are set apart to the proper distance and then bolted tightly to the body of the jig. The jig then is rotated 180 deg. in its trunnion bearings and a lower bearing shell casting is placed on the ledges. Then, the operator manipulates an air valve so that the bottom clamping cylinder pushes a clamp tightly against the casting to hold it in position. The operator then returns the jig body to its original position and places the upper bearing shell in position under an adjustable clamp, which is held open by a compression spring on the piston rod of the top clamping cylinder. Manipulation of another air valve causes this piston rod to move vertically downward and bring the adjustable clamp against the work. After the four bolt holes have been drilled and tapped, air pressure on the two clamping cylinders is released so the operator can remove the two shell castings from the jig.



With the two halves of the bearing shell clamped tightly together, it is a simple matter to drill and tap the four parting holes. A special tapping procedure has been worked out to eliminate the need for keyways in the parting surfaces

Synthetic Rubber Has Long Life In Blast-Cleaning Service

BY H. E. LINSLEY, WRIGHT AERONAUTICAL CORPORATION

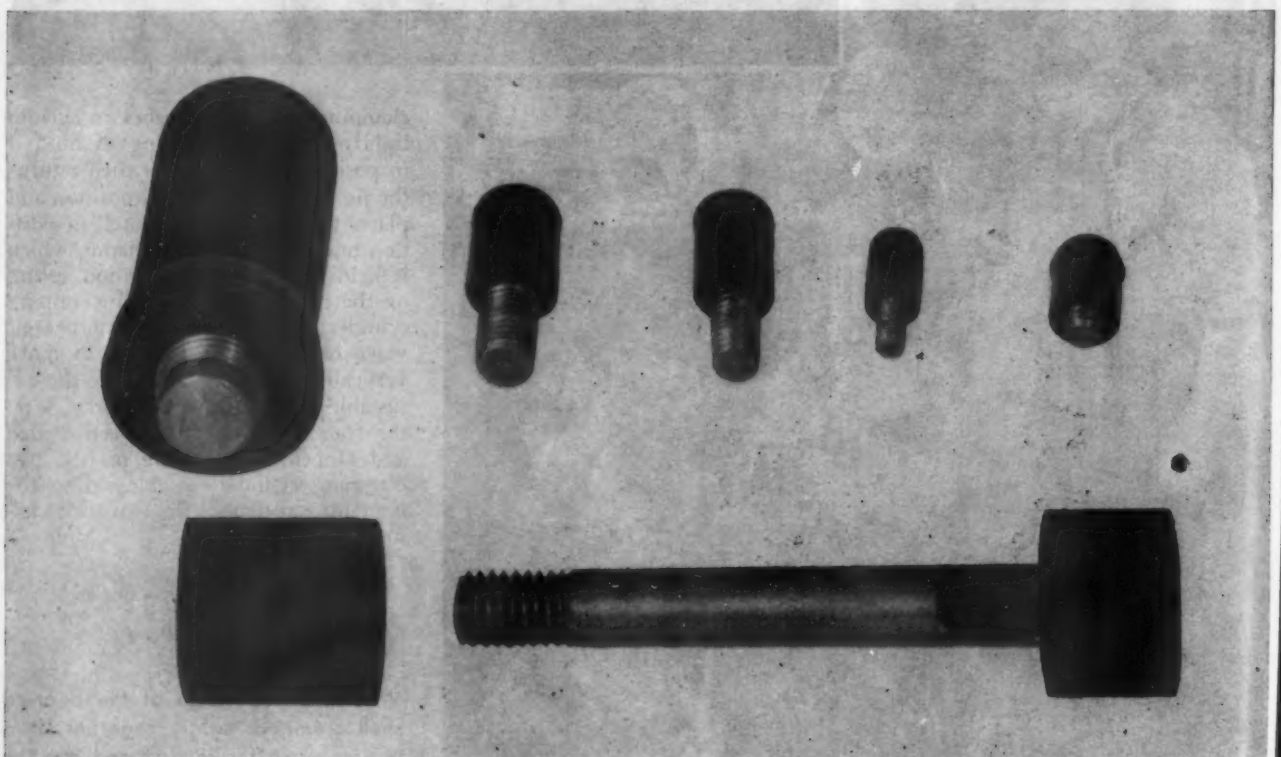
Rubber used in rotating blades, protective curtains and masks improves life of cleaning units used on Cyclone engine cylinders and conserves critical abrasive

WARTIME SUBSTITUTIONS have led to definite improvements in blast-cleaning equipment used in the Wright Aeronautical Corporation plants for cleaning aircraft engine cylinder assemblies prior to metallizing. The plants use airless Wheelabrator equipment in which abrasive is fed to the center of a multi-blade impeller and discharged at high velocity from the tips of the rotating blades.

Critical supply conditions of aluminum oxide and similar abrasive grains made it necessary to seek means of conserving the material. Breakdown of the abrasive was attributed in part to its action on the rotor blades, made from special chilled alloy castings and used in the "as cast" condition because of extreme hardness.

Eight blades are used in each rotor and as many as seven rotors are incorporated in one blast-cleaning machine. High-speed rotation of 2,200 r.p.m. made it necessary to weigh each of the blades and segregate them into groups of eight, with an allowable weight difference of not more than $\frac{1}{8}$ oz. between individual blades. This was done to eliminate vibration in the rotor and consequent whipping of the shaft, resulting in rapid wear of shaft and bearings. Under normal conditions, a set of blades had to be replaced every four hours, a total of almost two hours "down time" for every four hours of "running time" on a seven-wheel machine. Occasionally a single blade wore out before the other seven, making it necessary to replace the entire set to maintain balance.

To improve blade life and conserve abrasive, tests were made with rubber pads cemented to the blades. Natural rubber did not have sufficient abrasion resistance. An experimental program resulted in development of a compound known as No. 60 rubber, having remarkable properties. Proper adhesion of the rubber to the alloy base blade was obtained by molding the blades from a thermosetting plastic to which the rubber was bonded.



These rubber-headed screws are used for masking holes in the Cyclone cylinder head before it is shotblasted. Left to right are spark plug hole masks, two hold down screws and two small hole sealing plugs. Below is the bolt and nut for protecting the rocker arm hole

Seven Wheelabrator airless-type blasting heads are used in this special unit for cleaning cylinder assemblies used on aircraft engines. The use of synthetic rubber on the blades, curtains and deflector plates of these units, and the use of rubber-covered masks, has materially reduced maintenance charges and amount of abrasive required

The plastic blades cost less than the alloy blades, the need for segregating the blades was eliminated and power costs were reduced because of the lower weight of the units. A single plastic blade could be replaced without changing the rest of the set.

The rubber shortage, however, led to development of a synthetic compound. Fifteen tapered holes were made in the plastic blade and the compound was cemented securely in place.

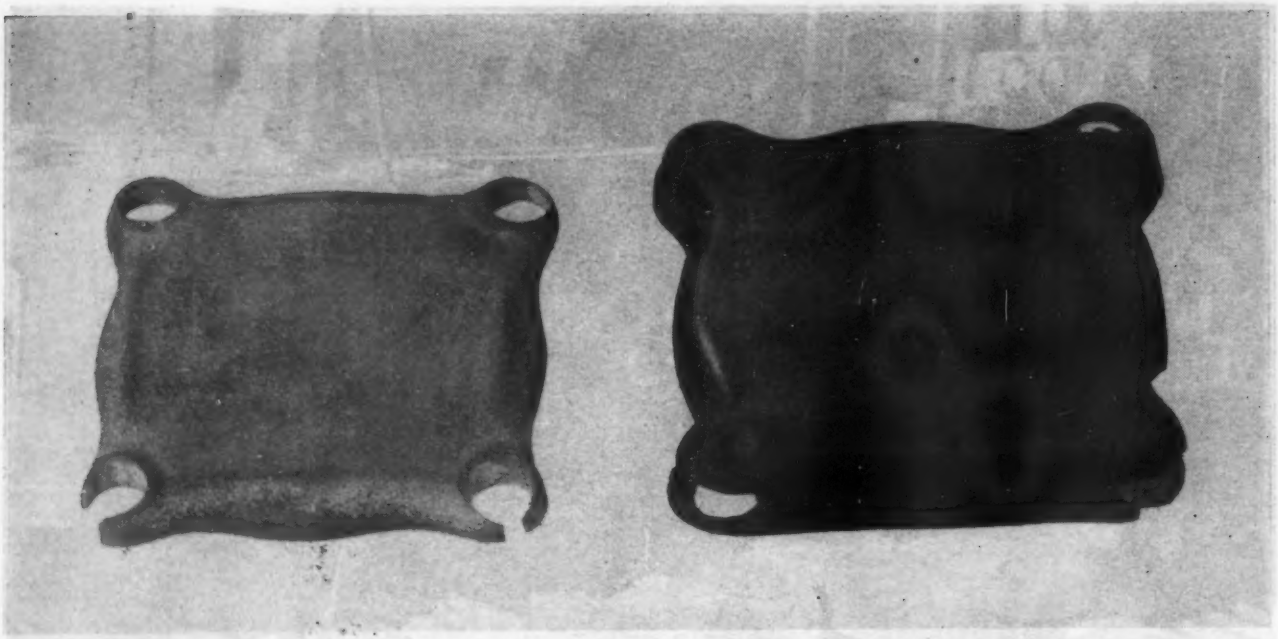
Originally, a heavy metal plate was installed at the rear of each rotor and partially surrounding it to protect the machine from abrasive grit carried over and discharged rearwards. The metal plate has been replaced by a synthetic rubber curtain ½ in. thick having a wide center rib ¼ in. thick. The rib wears down after about 24 hours of operation and a new rib is vulcanized into place. Use of the rib permits a reasonable amount of overtime running without cutting more than slightly into the face of the material.

As with the blades, the rubber curtain reduces the amount of grit breakdown, as particles merely bounce off the curtain instead of being wasted against the hard metal plate. Maintenance cost has been reduced sharply, since the original metal plate had to be replaced every 15 hours.

A deflector plate at the front of each wheel serves to direct the flow of abrasive as it starts to leave the blade tips. This plate was made originally from a block of cast alloy 1 in. thick and 4 in. wide, welded to a ½ in. thick baseplate. It had to be replaced every 15 to 18 hours, an operation taking one hour. The alloy block has been replaced by a synthetic rubber block of the same thickness, molded around a section of channel iron which can be attached to the base by cap screws. The block's life is increased to 24 hr., and there is a substantial saving in grit life.

During the blasting process, it is necessary to protect tapped holes and certain machined surfaces, notably the intake and exhaust faces and the top surfaces of the rocker boxes on the cylinder assembly. Masks first used for protection were made of cast iron ½ in. thick. Because the metal masks wore out completely within three months, it was decided to mold synthetic rubber to the desired shape around a plastic core designed to give adequate stiffness, and retaining screws were molded into heavy rubber heads. A threaded steel plug is used to seal spark plug holes. The thread provides only about two threads engagement to save time in inserting and removing.

A thick rubber washer protects the



On the left is a cast iron mask used to protect an exhaust port face which was so nearly worn through after three months' service that it was discarded. On the right is a mask of synthetic rubber used to protect the same opening which was worn away only at the edges after service of more than a year

face of the spark plug bushing and a long rubber handle facilitates handling. Other small holes in various parts of the cylinder head are similarly sealed by short screws molded into rubber-covered nut. A considerable reduction in grit consumption was noted following use of these masks, which have a life of from 12 to 24 months, depending on their location, and far outlast the metal masks.

The savings in "down time" and cost of protective equipment have been substantial. Actual consumption of grit has been reduced from 12 lb. per cylinder to 5 lb., a saving in money and a significant conservation step for this highly critical material.

Dumping Substandard Machines Abroad A Shortsighted Policy

BY HENRI BENEDICTUS

FUTURE EXPORT TRADE of the American machine tool industry merits serious study and sound planning. It would be a shortsighted policy to even consider the indiscriminate dumping of excess machine tool stockpiles on foreign markets merely to clear the way at home. Yet this has been suggested for the disposal of surplus machine tools held by the United States government.

Manufacturers must keep in mind the fact that customers abroad are accustomed to and expect American machine tools of superior workmanship, design and finish. This represents an important advantage in competitive markets, and should be safeguarded against those who would attempt to flood the European markets with American machine tools of substandard quality.

One former European distributor of American machine tools suggests that the U. S. government reach agreements with allied governments to control through organized channels the shipment of government-owned machine tools abroad. He points out it would be wise to market these machines through the former agents or representatives of the manufacturers to assure prospective buyers of adequate service, prevent useless price cutting, and avoid speculation by fly-by-night corporations.

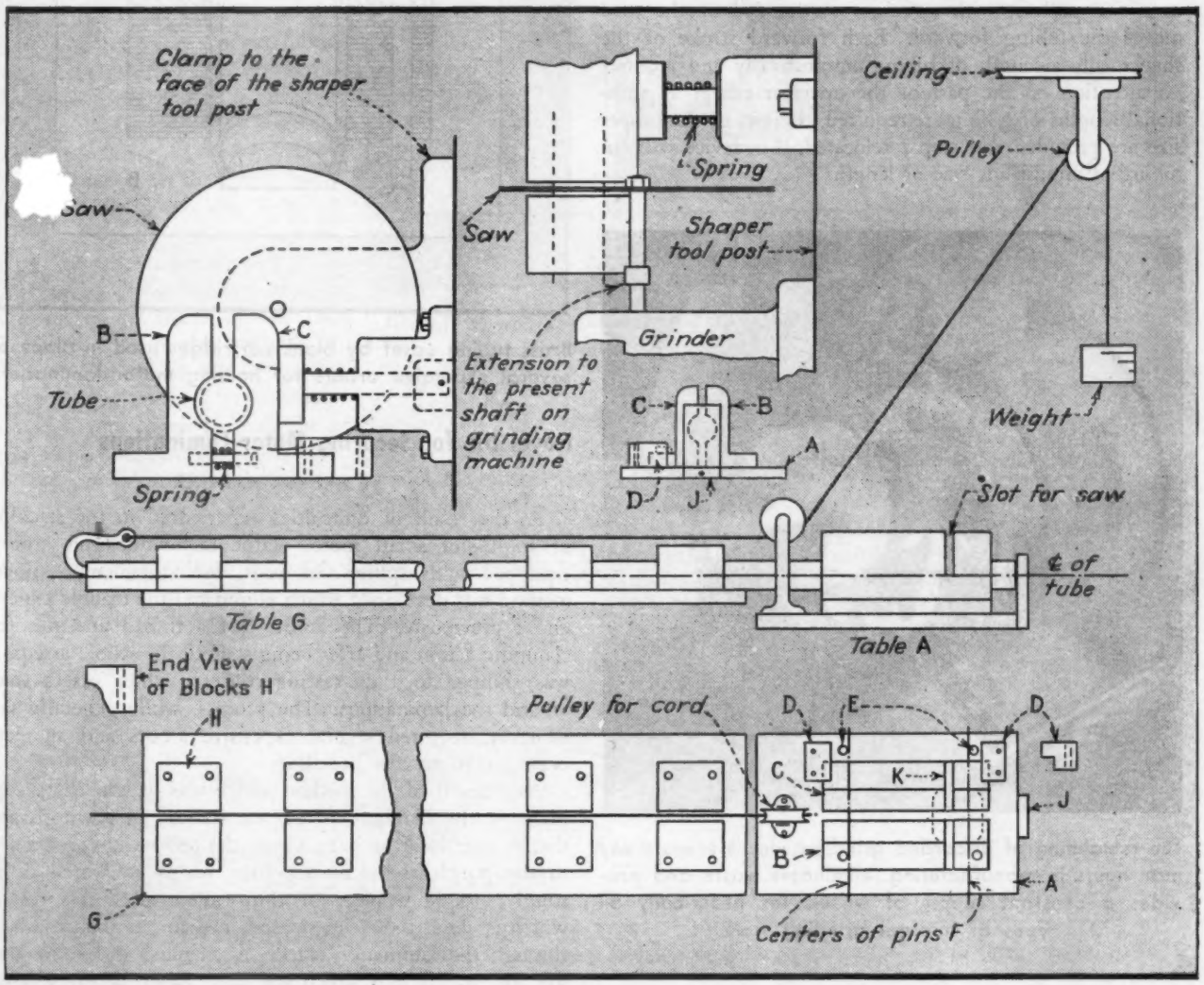
Export controls would help the American machine tool manufacturers to hold their foreign markets and protect future export interests, he maintains. The government, in cooperation with allied governments, could permit certain long-term credits to assist in European industrial reconstruction. Further control could be established by granting the dollar exchange or guaranteeing the rate of exchange for deferred payments, similar to a program which worked satisfactorily after the first World War. The distributor hastens to assert, however, that such government controls should be confined to the reconstruction period, and should be lifted as soon as normalcy returns.

The question of second-hand machines is more complicated. For such government-owned machines, it would be wise to follow suggestions outlined on April 3, 1944, by the Industry Labor Advisory Board of the War Production Board, in which it was proposed that "second-hand machine tools in need of repair be factory rebuilt." Other government-owned machine tools that have been used but are in good condition might be handled for export in the same manner as new machines.

The foregoing suggestions apply only to export transactions with European nations where trade will be free. They would not be suitable for countries where business and industrial activity are controlled entirely by government.

Practical Ideas

★ **War-Winning Suggestions appearing on these pages were selected from those recognized as meritorious by the Board for Individual Awards, War Production Drive. They are freely offered to industry as an aid to war production** ★



An ingenious method of adapting a shaper to a cut-off job

Adapting a Shaper to Cutting Off Tubing

BY ROBERT MAWSON

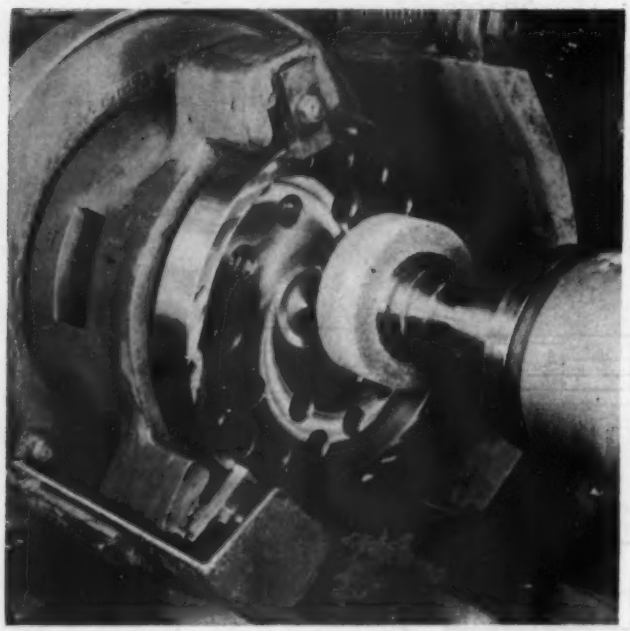
A small shop recently obtained a subcontract to cut 12 to 15-ft. lengths of brass tubing, 7/16 in. in diameter into 3-in. lengths, with several thousand pieces being involved in the order. A power saw could have been used for the job, but then it could not be used for other purposes, so an idle shaper was adapted to do this job.

This adaptation was made through the following procedure: Steel plate *A* was fastened to the shaper table by means of clamps. On the plate is mounted a fixed location block, *B*. A second locating block, *C*, slides in ways, *D*, the extent of its travel being determined by stop *E*. Two pins, *F*, are press fitted into block *B* and are sliding fits in *C*. Springs are mounted on each pin as shown.

Also in the table is a board, *G*, upon which are mounted a series of wooden blocks, *H*. At the extreme end of plate *A*, a stop, *J*, was placed. To complete this portion of the arrangement, a slot, *K*, was machined in blocks *B* and *C*. A small electric grinder was then mounted on the toolpost of the shaper and the grinding wheel replaced with a small circular saw. In action the toolpost travels forward with the saw in operation. An arm attached to the

lower surface of the sawing unit comes in contact with *B* and clamping the tube being cut. The balance of forward travel of the shaper arm carries the saw through the tube for the cutoff action. On the return stroke of the shaper the two springs force block *C* back and the cut piece of tubing drops from block *B* through an opening in plate *A*.

The tube is positioned by means of blocks *H*, it traveling along their concaved surfaces. A small hook, placed in the hole of the tube at the left end, and a cord, which passes over two pulleys, with a weight at the end of the cord moves the tubing forward. Each forward stroke of the shaper cuts a length of tubing automatically and requires no attention on the part of the operator except as additional lengths of tubing are required. If jaws of the proper size are provided and stop *J* relocated, this device will cut tubing of almost any size or length.

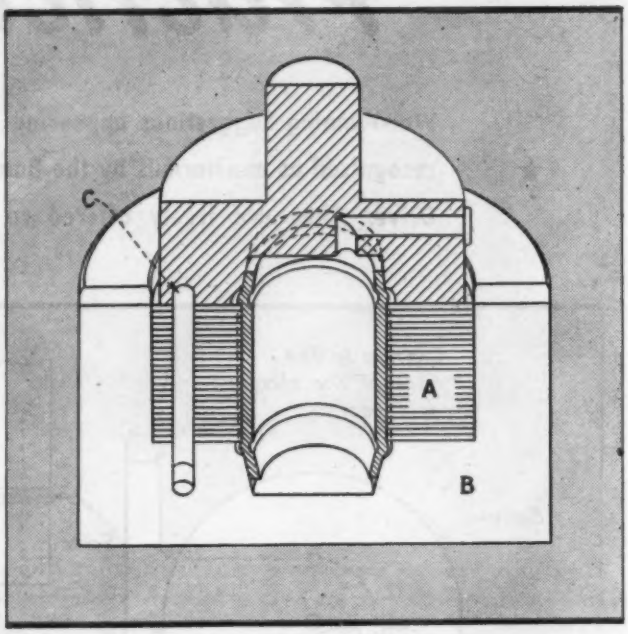


The reclaiming of discarded grinding whee'.s saves many man hours in manufacturing, eliminates waste and provides a constant supply of wheels for practically all types of internal grinding work

Special Adapter Reclaims Discarded Grinding Wheels

BY JACK T. AKERS
Curtiss-Wright Corporation, Indianapolis

By means of a special adapter made in the tool shop it has been found possible to make use of discarded grinding wheels by mounting them on internal grinders, thereby making them useful for almost any kind of work requiring inside grinds. These discarded wheels can be used on any internal grinder where conditions warrant, depending on work size and material, wheel head speed and proper adapter. *War Winning Suggestion from the Board for Individual Awards, War Production Drive.*



Brass tubing upset by blank cartridges used in place of several expensive arbors for holding motor laminations

Novel Die for Securing Motor Laminations

BY ARTHUR K. BAKER

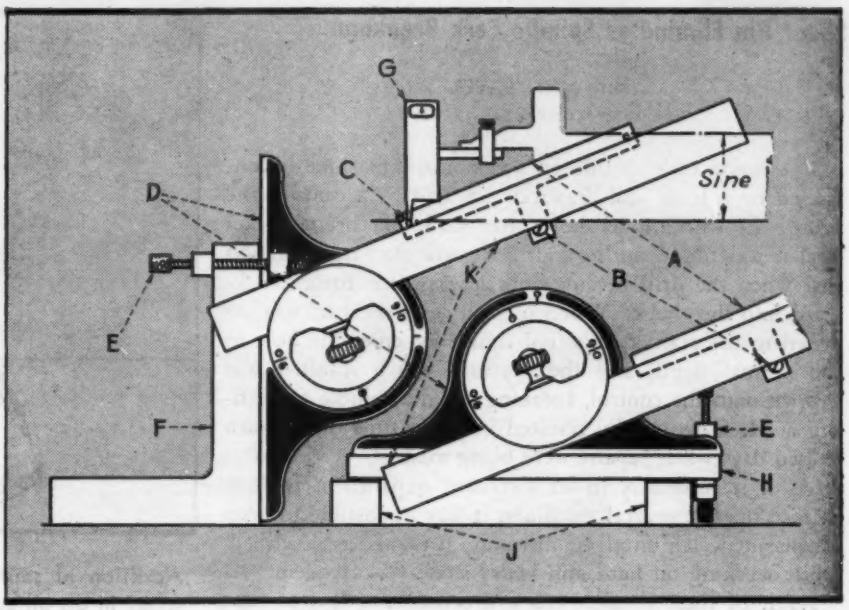
As the result of difficulties experienced in the stacking of multi-slot small motor stator laminations on arbors, equipped with splines, or pegs, for alignment, a novel method was developed which eliminated the trouble experienced previously. The arbors had a thread and nut for clamping action and after being stacked the whole assembly was shipped to a die-casting concern, which cast a shell around the laminations. The process, while generally satisfactory, required several expensive arbors and an elaborate technique for handling.

As a result of the method which was developed to supplant it, the laminations, *A*, are stacked in a cup-shaped die, *B*, over locating pegs, *C*. In the bottom of the die and in the punch are secondary cups which are bored to fit snugly around a piece of thin-walled soft brass tubing which is about 0.005 in. smaller in diameter than the bore through the lamination stack. A chamber is left in both die and punch into which the brass tube can upset when an explosive charge, usually a blank cartridge, exerts pressure on the inside of the brass tube. The snug fitting ends of the brass tube expand in the die and punch and form a gas seal. The upsetting is complete enough to bulge metal between the teeth of the laminations and act as locating splines to keep the laminations from turning when they are removed from the die set. This method of holding the shipment and die-casting is much more satisfactory than the one used previously and after the parts are returned from the die-caster the brass tube can be peeled out in the same way a sardine can is opened. While an explosive charge is spectacular and usually effective experiments are now being carried on with shock pressures applied hydraulically as a means of expanding the brass tube.

Checking Angles to Minutes On a Common Protractor

BY C. O. HOLMQUIST

Minutes as well as degrees can be set accurately on a common protractor by means of a unique, but simplified sine bar shown in the illustration. It resembles an elongated letter T of ¼ in. cold rolled steel, or other suitable stock. The top blade of the T is 5½ in. long, with the short arm extending from the center 1 in. Each is 5½ in. wide. Stock material size required is ¼ × 1⅝ × 5½ in. Two 3/16 in. dowel pins, *C*, are set exactly 5.000 in. center distance, on the approximate center line of the long blade. A 10/32 in. flat countersunk head capscrew, properly located, requires very little pressure to hold the bar and pins in place firmly on the blade, or scale, *K*.

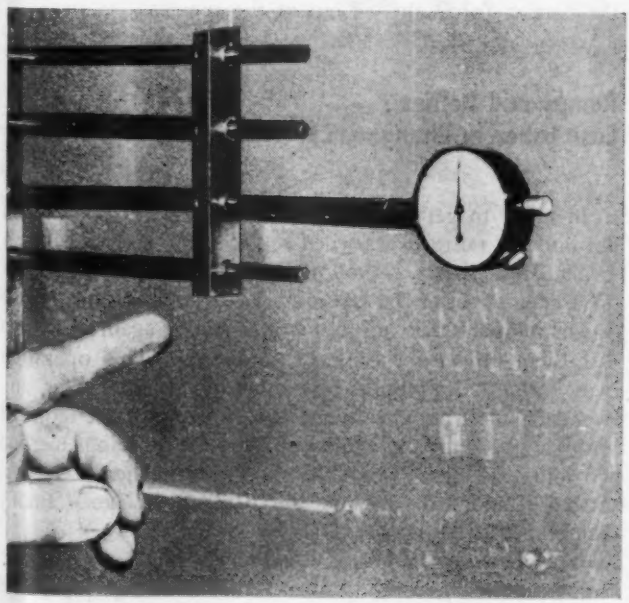


Minutes, as well as degrees, can be checked by means of a simple sine bar, attached to a common protractor

The sketches show two methods of mounting. The one at the left is for an acute angle, where *F* is an angle plate and *E* is a clamp holding the protractor *D* in place for test. The other, on the right, is set for an obtuse angle where the protractor *D* is clamped to parallel *H*, resting on two accurate blocks, *J*. Many other methods for mounting can be used.

To use for an accurate setting, or test, make approximate adjustment of the protractor to the desired number of degrees. Mount the protractor on a single plate, or parallel, as shown in the illustration. The sine of the required angle is then multiplied by 5. This indicates the difference in height, which should be shown by the two pins, *C*. If these figures do not agree, adjustments should be made until the exact difference is reached.

An indicator, *G*, attached to a height gage, is a convenient method for making this check. All guesswork and doubt as to accuracy is eliminated with this method and no magnifying glass or straining of the eyes is necessary. Summarily, the device is merely a homemade sine bar, built especially for easy attachment to any standard protractor and which makes use of the principle of checking angles.



The multiple dial indicator shows the progress and finish of each lathe cut

Multiple Stock Dial Indicates the Progress of Each Lathe Cut

BY HIRAM E. WISER
International Business Machines Corporation

Whenever parts are being held to close dimensions and a series of steps, or shoulder cuts are being produced on the outside or inside diameter of stock, the bars shown in the illustration of the multiple-stock unit are set in the exact position of each finished cut to correspond with the table travel. This calibration of the stock dial must be made with a finished part. When this has been done the indicator should read zero.

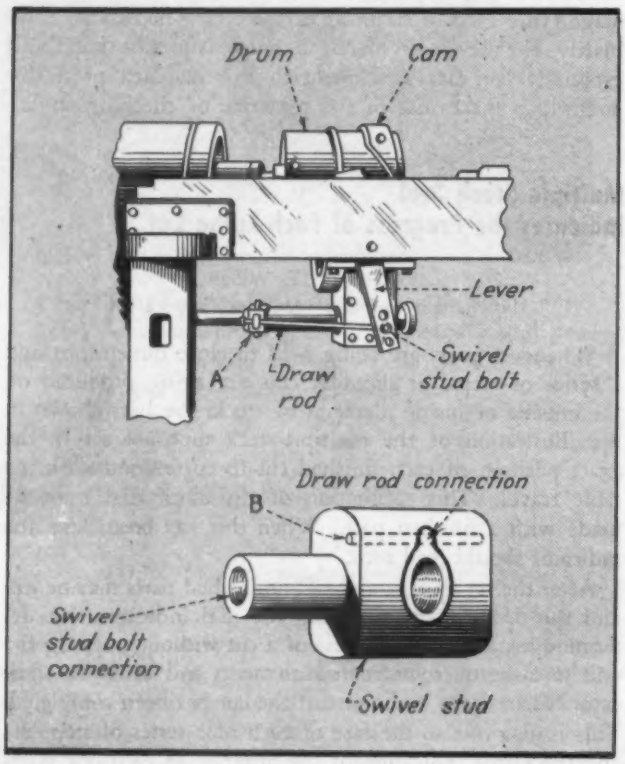
After the set-up is completed unfinished parts may be run and the operator, by watching the dial indicator, can determine instantly the progress of a cut without stopping the unit to make micrometer measurements and when the indicator reaches zero it shows that the cut has been completed. This is also true in the case of each of a series of step cuts and the visual indication of the progress of each one eliminates frequent stops for measurements and calculations. *War Winning Suggestion from the Board for Individual Awards, War Production Drive.*

Shear Pin Eliminates Spindle Fork Breakage

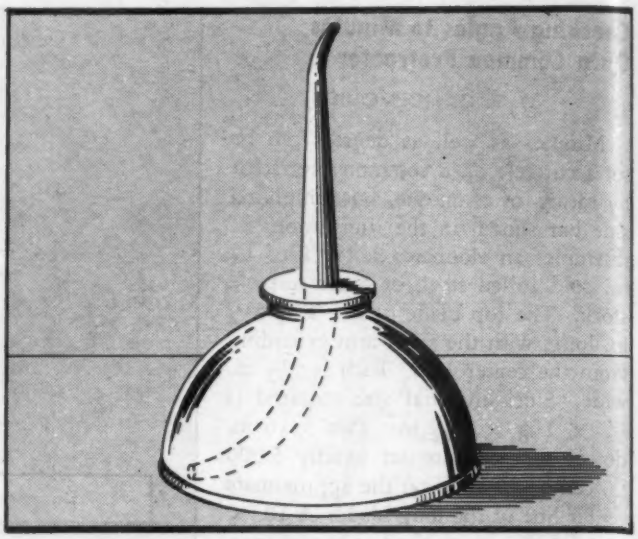
BY W. E. BIEBER
Packard Motor Car Company

The action of a spindle on a Conomatic machine is controlled by a lever and drawrod, actuated by a cam on the drum. In working on heavy bar stock of chrome-nickel steel it was found during a drilling and reaming operation that when the drill became dull it was often forced backward into the chuck. When in such cases the part was indexed to the reamer, this tool could not enter the hole to the normal depth and the pressure which resulted was thrown onto the control, breaking the die spindle for casting at *A*. This usually resulted in down time of as much as two days while repairs were being made.

As it is customary in an automatic department for one man to operate several machines, it was impossible to keep a constant watch on all of them and breakage as described, while working on hard and heavy steel, was frequent. As a result of these breakdowns and consequent loss of time a swivel stud was designed, into which a shear pin was inserted, as shown at *B*, after which, when the foregoing conditions occurred, the shear pin would break before the casting, allowing the control lever to swing free. As a result of the addition of these shear pins the down time on three machines has been practically eliminated and they are to be installed on all machines of this type in a large department of the plant. *War Winning Suggestion from the Board for Indivdual Awards, War Production Drive.*



Breakage of spindle fork castings on automatics and consequent down time have been eliminated by the addition of a shear pin, mounted in a swivel head



Addition of small piece of tubing to the lower end of spout in an oil can makes overhead or uphill oiling easy

An Oil Can That Works Uphill

BY FAY E. CLARKE

It is often necessary when oiling bearings, or supplying oil to the points of a cutter in milling out box jigs and the like, to literally force the oil to flow uphill by means of an elaborate pump can. This device, however, can be dispensed with by adding a piece of tubing to the bottom of the spout of an ordinary oilcan.

A can should be selected which has a bottom with a good snap to it and a piece of small tubing soldered into the inside of the lower end of the spout. This additional tubing should be long enough to reach almost to the bottom of the can, as shown. If the can is full a quick snap on the bottom forces the oil out of the spout.

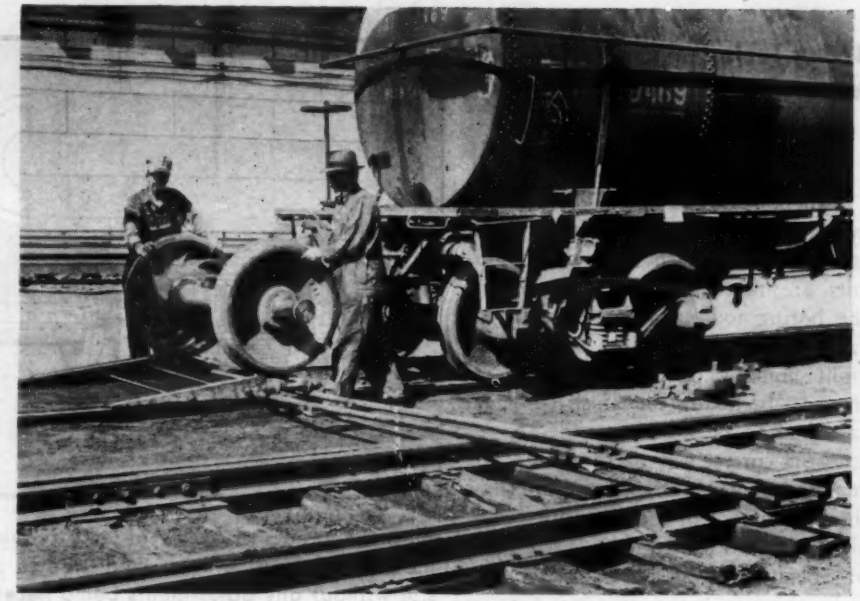
Ramps and Dollies Ease Labor in Changing Car Wheels

BY L. W. SAGLE

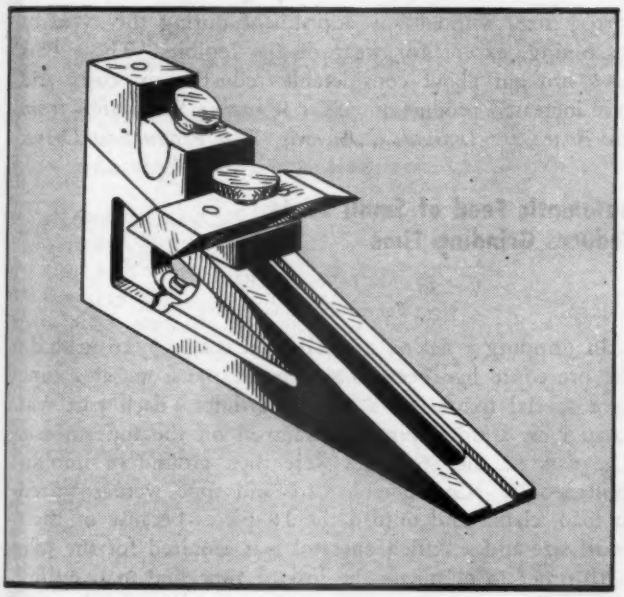
In order to get a pair of wheels weighing about 1,000 lb. under a railroad car when replacement is required it is generally necessary to roll them down an adjacent track to a spot opposite the end of the car under repair, throw them off that track, up and over the rail again and then lift them up on the rails where needed. This operation was formerly accomplished by means of manpower and wooden poles, but the amount of muscular effort required brought about the desirability of some less laborious method of doing the job. Two of the shop force at the St. George, Staten Island, car yards of the B. & O. Railroad finally came up with an answer.

They had worked out a device which consisted of a track, jointed for easy handling, made from 2 in. o.d. pipe, held together by welded crossbars. Two small dollies, with flanged wheels are used to transfer the pair of mounted wheels from one track to another.

A ramp, 36 in. long, fitting snugly on the heads of the rails, is used to roll the wheels from the track up and onto the two dollies. The ramp is then carried over to the other track, the wheels pushed across on the dollies, down the ramp to the track and the job is done. The pipe track is then dismantled and placed on a push car, ready to be moved to another location. Simple in design and easily manufactured, it is the safest device so far developed for changing car wheels and will be adopted as standard practice at all car yards on the B. & O.



Car wheels are now rolled on ramps and dollies to the desired location in B. & O. car shops, saving time and eliminating much hard labor



A scriber, attached to a planer gage, which is regularly used for making precision layouts, in preference to a vernier height gage

Scriber on Planer Gage Used for Layouts

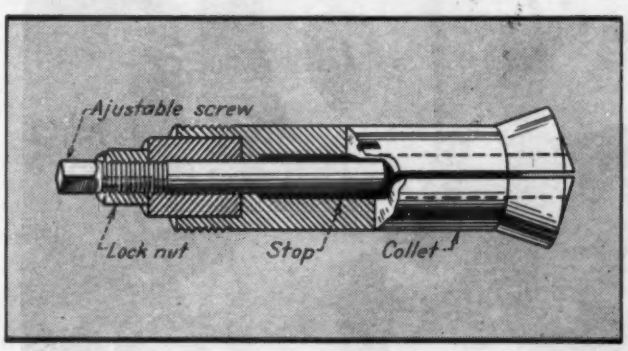
BY C. M. HUNTLEY
Pan American Airways

Due to the fact that only one vernier height gage was available in the shop and almost continually in use, it was considered advisable to devise some other means for making layouts. As a result a scriber, attached to a planer gage, has been used in making layouts that require precision and since its development has been regularly used in preference to a vernier height gage, as results can be more quickly determined.

Adjustable Stop Adapter for Use in Lathe Collets

BY JOSEPH F. ZIELINSKI
International Harvester Company

The stop formerly used in collets in this plant was an ordinary steel plug which was pressed into place and adjusted to obtain the desired length. These changes of tools required considerable time and caused delays in production. In order to eliminate this lost time an adapter was designed consisting of a bushing, with a threaded stop and locknut, which was pressed into the collet. This device makes it possible for the operator to quickly set stops at various desired lengths and it can be used on lathe collets capable of holding work ranging from $\frac{3}{8}$ in. to $\frac{7}{8}$ in. o.d. Adoption and use of the device in this plant has resulted in a considerable number of productive man hours being released for other work. *War Winning Suggestion from the Board for Individual Awards, War Production Drive.*

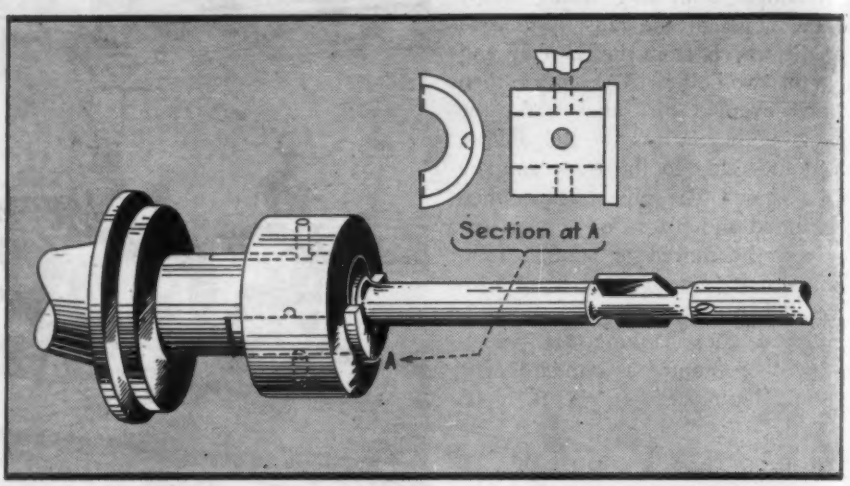


A lathe collet adapter which can be easily adjusted to hold work ranging from $\frac{3}{8}$ in. to $\frac{7}{8}$ in. o.d. which, because of the time saving it effects, has released many productive man hours for other work

Boring Tools Mounted in Removable Bars

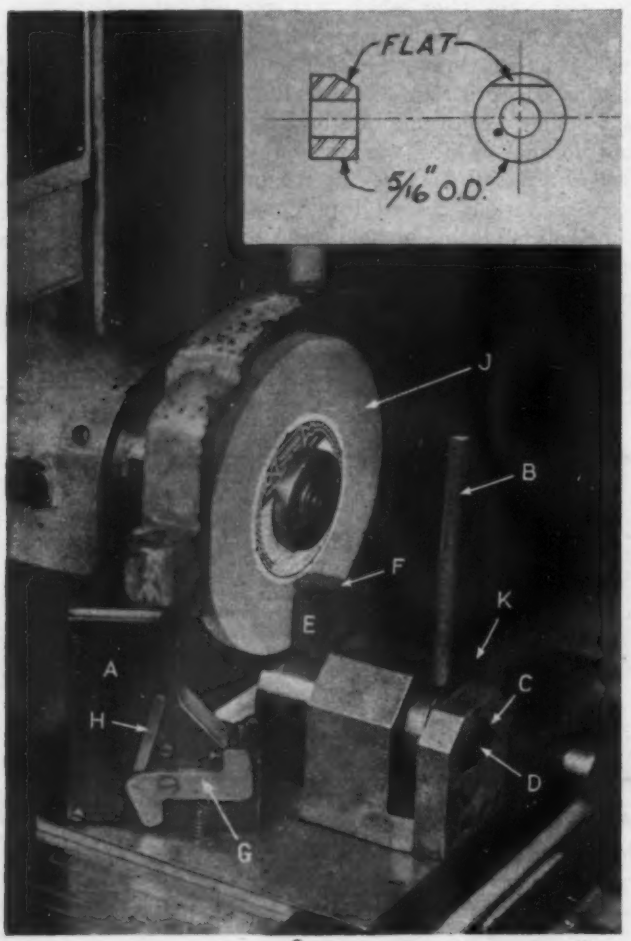
BY JOSEPH GRALEWCZ
A. O. Smith Corporation

When boring 1½ in. holes in a cylinder approximately ⅛ in. of stock is removed on each side. Numerous cuts are taken and before each cut the boring tool must be properly located in the boring bar, so that the right amount of stock will be removed. In taking the finish cut great care had to be taken in order to insure the correct size of the hole. The repeated, but necessary, relocation of the boring tool in the bar caused considerable loss of time in each cycle of operations.



Boring tools for a series of cuts required in machining cylinders are now mounted in bars, which, when used in proper sequence, insure correct hole size without any adjustments being necessary, except for wear of the toolbits

In order to reduce this lost time, it was decided to provide a series of removable boring bars, with a complete sequence of tools mounted in the bars. This arrangement eliminated the necessity for changing tools on every cut and all that is now required of the operator is to use the bars in proper sequence. Use of the final bar will insure a hole of the correct size, without any adjustment during the cycle of machining, except for wear of the toolbits. These bars have brought about considerable reduction in costs and have increased production. *War Winning Suggestion from the Board for Individual Awards, War Production Drive.*



Automatic Feed of Small Parts Reduces Grinding Time

BY ANTHONY URBAN
Niles-Bement-Pond Company

In grinding a flat on a small steel spacer 5/16 in. o.d., the procedure had been to set up the parts one at a time in a special fixture on a surface grinder. Each part was located on a small pin and clamped on the top surface. The flats on the 16 pieces were then ground in line simultaneously. Considerable care and time were required to load, clamp and unload the 16 pieces because of their small size and a skilled operator was required for the job.

In order to eliminate the loss of time due to handling the small parts individually, a new method of doing the job was devised. The small parts are now dropped into the hopper, *A*, after which the handle *B* is swung to the left until stop *F* strikes the actuating finger *G*. At the same time the cam *C* actuates the follower *D*, which in turn causes the jaw *E* to open. When the stop *F* strikes the finger, *G*, the latter is depressed, permitting one part at a time to enter jaw *E*. The same movement actuates the link *H*, which jiggles the hopper load, insuring proper feeding of the pieces. This method is considerably faster than that previously used, even with relatively unskilled labor and the principle employed can be adapted to many similar operations. *War Winning Suggestion from the Board for Individual Awards, War Production Drive.*

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A considerable saving in time resulted from use of this automatic feed for grinding flats on small steel spacers

RECONVERSION
SECTION OF AMERICAN MACHINIST

From Rifles Back to Typewriters

How L. C. Smith & Corona Typewriters, Inc., Reconverted

Careful planning combined with tapering off of war production enabled Smith-Corona to reconvert without any lost time and to use to advantage war-found knowledge and experiences

RECONVERSION has given L. C. Smith-Corona Typewriters, Inc., an opportunity to embark upon a program of modernization that will reduce the average age of machinery in use by about 25 years. In addition, better typewriters are being produced through the use of knowledge and machines gained through war production. Reconversion has taken place only at the company's main plant at Syracuse, N. Y., as the other plants are still busy producing war goods of various kinds.

Smith-Corona ceased making Springfield rifles in much the same manner that they started producing them—gradually. This enabled the company to get into normal production with a minimum of fuss and frenzy, for as equipment and manpower requirements of rifle making diminished, men and machines were immediately moved into typewriter production lines. The company is now producing approximately 65 percent of capacity—and will probably continue at this rate until unlimited output is again possible.

All during war production, Smith-Corona maintained a pilot line to produce repair parts for typewriters in service and to make a few machines for government agencies that needed them urgently. By running this line as needed, a small percentage of employees was always trained for normal production. These employees and the many others who were retained throughout war production helped to train any employees without previous typewriter experience. The pilot line was set away in a portion of the plant where it could not interfere with rifle output.

In its plant, Smith-Corona is setting a pattern that will probably be duplicated in many plants throughout the country. For although the typewriter models now being made are almost identical with those made before production was ordered stopped, reconversion set into motion a modernization program that contemplates expenditures of about $700,000 for machine tools and other production equipment.

As with many plants, production at Smith-Corona before the war was on a departmental basis; that is, there was a milling machine department, a screw machine department and other departments organized around the equipment used rather than by parts that are being made. Some of the departments were fairly close to each other, but regardless of distance, interdepartmental movement of parts was greater than necessary. This situation was corrected in reconverting by following a well considered plan which placed machines according to the sequence of operations on the part. This has speeded production and reduced inventories of parts in process.

A typical before and after case is that of the typewriter base. On this piece, 16 machines are used, including profilers, drills, tapping and milling machines. Formerly, the bases were given two profiling operations, moved to the drilling department for one drilling operation, returned to profiling for one more operation and then taken back to the drilling location for two drilling and three tapping steps. From there the parts were moved to the milling machine section for one operation, and finally made a third trip back to the drilling machines for a final tapping. Now all machines operating on the bases are located in one section and the parts pass progressively from machine to machine with no backtracking. Essentially the same type lay-out was evolved for each of the five other castings of the typewriter which require extensive machining.

In readapting the plant for typewriter production, better arrangements were made in the punch press department. Here, in the past, new machines were added as needed and placed where room could be found until finally there was considerable distance between some related operations. Too, with process changes through the years, a situation finally resulted where raw material was received at one end of an

MACHINE REPLACEMENT SCHEDULE

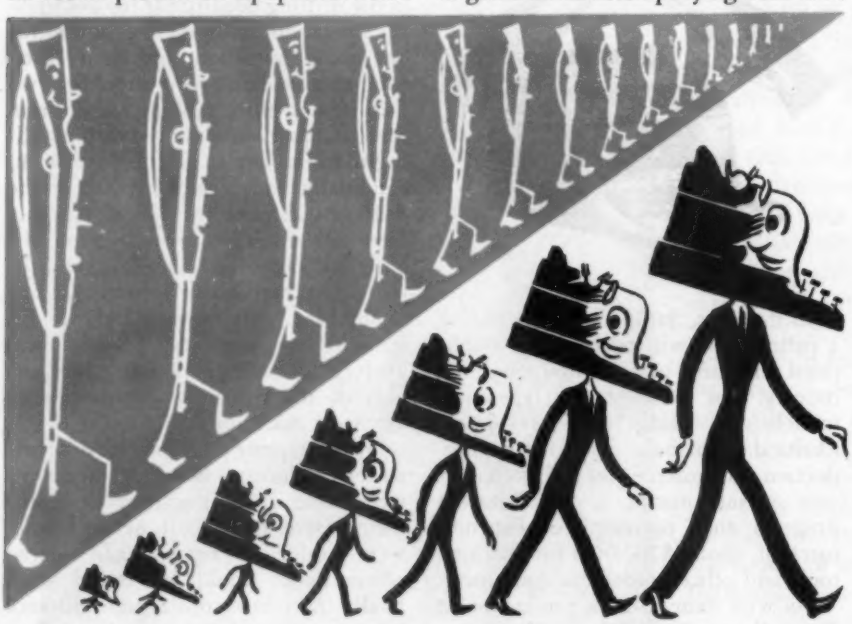
Department	On Hand	To Replace	Comments
Milling	128	120	All types and sizes
Screw Machine	113	77	
Drill Press	94	53	Machines from 1- to 8-spindle
Profiling	21	21	
Heat-Treating	Entire department has already been replaced		
Toolmaking and Model	119	60	Machines of all types
Cutter Making and Grinding	27	10	In addition to 12 machines already acquired
Organic Finish	18	18	Spray booths and baking ovens

L-shaped building while more than 50 percent of the sheet steel was blanked at the other end of the building. This meant that much needless hauling was involved, not only in taking the steel to blanking presses, but also in taking blanks back to second operation presses and hauling scrap metal away. Now blanking presses which handle the greatest quantity of steel tonnage are located adjacent to the material receiving and storage area. Other blanking is done as close as possible to second operation presses.

While much progress has been made in the Smith-Corona modernization program, much of the plan will be projected over a period which may range from three to five years. This phase is the procurement of new machine tools and other production equipment. More than one-quarter of this new equipment is already on hand, more is on order and still more will be purchased when conditions permit. Of the $216,000 (original purchase price) of machinery acquired already, $194,000 was purchased by the government for the rifle contracts. This is about one-half the government equipment which had been placed in the plant. Machinery which is not being retained has been removed from the plant and the majority of units disposed of by the government. Other machinery and equipment to the amount of $22,000 has already been purchased. Some of this is slightly used and the remainder new.

The major portion of the Smith-Corona's machine replacement schedule is given in an accompanying box. This schedule covers most principal departments, with the exception of the punch press section, where no major replacements are contemplated, but the purchase of additional equipment is planned. As indicated, some of the replacement has already taken place, and in addition 30 of the proposed 120 milling machines have already been acquired, as have 11 profilers and $50,000 of cutter making and cutter grinding equipment.

The manufacture of rifles will have a permanent effect upon the production of typewriters in this plant. First of all, the need for complete interchangeability of rifle parts has made Smith-Corona even more aware of the value of inspection all along the line. Now there are groups of trained inspectors which cover all manufacturing operations, as well as an augmented staff of inspectors in the assembly department. Parts inspectors check first pieces of run and make spot checks throughout the entire run, and can stop production at any time to correct set-ups. In addition, all tools and dies are now inspected upon completion of a run. If satisfactory, the tools are held for further use; if not they are repaired or replaced. Plans are to extend inspection activities to a point just short of where they become uneconomic.



An important factor in Smith-Corona reconversion was the stepping-up of typewriter production as rifle output was gradually reduced

Hyper Milling Adopted

Probably the biggest change in machining methods is the adoption of high-speed milling wherever possible in the Smith-Corona plant. A chance to learn about this manner of machining came with rifle production. It was so satisfactory to production officials that they are eagerly awaiting more new milling machines which will provide suitable speeds. Most millers are being operated at top speeds now, but in many cases this is not fast enough.

New Heat-Treating Department

The company is keeping intact a new heat-treating department set up for rifle production. Since many of the parts being treated require chiefly a wear-resistant surface rather than any deep hardening, cyanide baths are used for heating the parts. This department is now considered complete, as far as reconversion is concerned.

New and better finishing methods in the plant have resulted in the output of a typewriter that can be sold as rust-resistant. Prior to 1939, these claims were made only for machines that had been specially treated. Outstanding in new equipment is a high-speed nickel plating installation which is giving a better base for chrome plating and which eliminates much hand buffing and polishing. Further hand finishing is eliminated through the use of Roto-finishing for deburring a multitude of parts. Further extension of this finishing method is planned. It has been learned through experimentation that this method may be used for deburring, polishing and burnishing parts, even in extremely small quantities. Those parts which are not now plated will probably be Lubrized or finished by zinc electroplating in the near future.

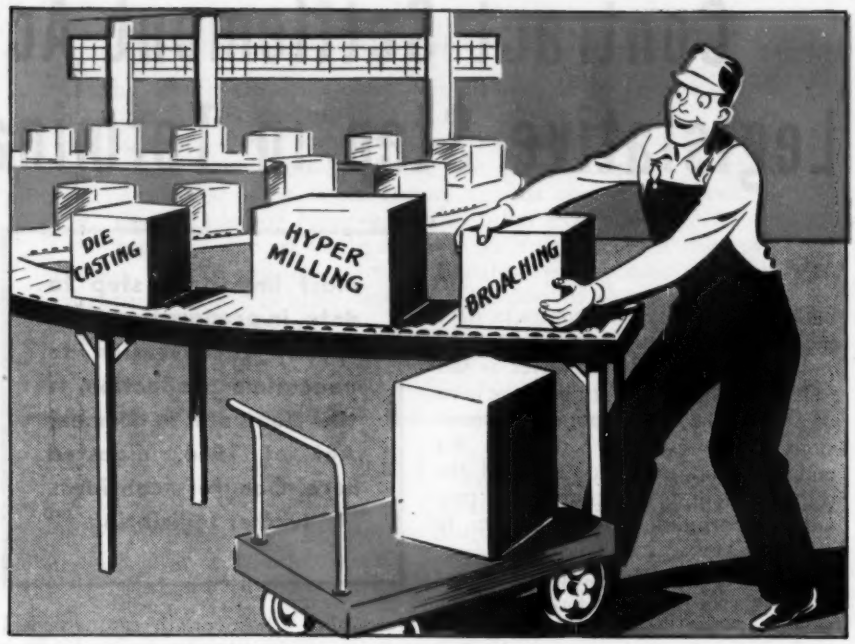
As soon as possible the painting department is to be modernized by the addition of complete conveyor installations and new spray booths and drying ovens. It is likely that the drying in the future will be chiefly by the infrared method. In cases where sheet steel parts are given an organic finish experiments are being made with paint-grip steel. Such steel is furnished with a flash-coating of zinc and Bonderized and requires no further treatment before paint is applied.

Brazing to Be Applied

Engineers are now busy looking for applications for copper-hydrogen brazing. There are many parts on a typewriter which are now joined by soldering, but it is felt that controlled atmosphere brazing will be better, cleaner and less costly.

Assembly operations are now speeded considerably, as compared to prewar production, through the use of air-cylinders in subassembly fixtures. This, too, comes as a result of learning the advantages of air-clamping when engaged in rifle production. A constant watch is maintained to make certain no logical application of this work holding method is overlooked.

At the present time, company engineers are investigating the possibility of replacing the five or six major castings used in a typewriter with die castings. This, it is felt, will provide lighter, better and cheaper castings upon which less machining and surface finishing will be required. Castings now used are nearly to finished size, and on each there is considerable work to be done, filling small holes and otherwise providing a smooth, clean surface.



All new processes introduced during rifle production were examined to determine how they could be applied to typewriters and many were kept

Now as to the less physical aspects of Smith-Corona reconversion:

One definite gain, as far as employees are concerned, is the addition of a cafeteria for their use. Special space had to be provided in the plant for the test-firing of rifles. When this need no longer existed, the rooms were reconverted into a clean, compact cafeteria. Prior to the war no such eating facilities were available.

In changing over from rifle to typewriter manufacture there was little, if any, personnel problem. This company has always had many women employees, and the policy was continued throughout war production. Thus, there was little drain on manpower through the draft.

In going back to typewriter production, the only labor shortage that appeared was in aligners, the men who make certain that the letters on each machine are properly lined-up. It takes up to two years to train aligners, and young men are needed for the job, and there is no source of such labor.

Since the reconversion was effected without any plant shut-down and very few lay-offs, there was no pronounced labor migration. Contributing to the stability of employment was the promise of postwar security which halted many from shifting to other war jobs which may have offered temporarily higher pay.

What labor had to be dropped was taken care of promptly through War Manpower Commission representatives who spent several days at the plant. Peak normal employment at Smith-Corona is 1,800, while the peak for rifle production was 1,650. Employment now is about 1,200.

Disposal of surplus material and machines was also a comparatively minor problem. When orders to cease rifle production were given, there was enough warning to permit most materials and parts to be consumed. Remaining finished parts, after the last rifle was assembled, were sold to the government as spare parts on an equitable basis.

After a determination had been made as to the number and types of government owned machines could and would be retained, the others were hauled out of the plant and placed in storage. They were shipped from the warehouse upon government order. All that now remain are a few special purpose machines which are not needed anywhere, due to the general reduction in rifle requirements.

The reconversion at Smith-Corona has been termed by some as "A Dream of a Reconversion." In essence it was, but it also demonstrates what most plants can do by careful planning before war contracts are terminated and before reconversion is directly upon them.

Contract Settlement Act Is Initial Legislative Step in Termination Program

Most important step to date, in preparation for a speedy reconversion to peacetime production, is the Contract Settlement Act of 1944, digested here. Congress considers further legislation

PRODUCERS whose war contracts have been terminated and settled have by and large expressed themselves as satisfied with the treatment they have been accorded. They have found the provisions of the Contract Settlement Act equitable and designed to speed the completion of negotiations or to provide opportunities for recourse to courts of law.

While the Contract Settlement Act of 1944 sets up many basic precepts, its provisions are flexible and are subject to the establishment of detailed policies, from time to time, by the director of contract settlement.

The power of the Director of Contract Settlement—recently appointed Robert S. Hinckley—are broad, and even the duties or functions "conferred or imposed on any government agency by" the act are subject to his orders. Presumably the sponsors of the act, realizing the impossibility of foreseeing every contingency, chose to clothe the director with power to mold its provisions to fit the changing needs.

To aid and guide the director in the execution of his duties, the act creates a Contract Settlement Advisory Board consisting of the heads of specified pertinent government agencies.

Types of Settlement

Two basic types of settlement are provided: bilateral, or negotiated, in which the war contractor and the contracting agency termination officer consider the claim submitted by the former and arrive at an agreement as to amount to be paid; and, formula, under which the agency determines the amount due, "without such agreement."

Review

Each settlement agreement in excess of $50,000, "or such lesser amount as the Director may from time to time determine," is for thirty days subject to review by a settlement review board. Review boards are established by the contracting agency in each unit authorized to make settlements. Review board disapproval of a settlement can be overridden by the head of the unit. These boards act only to protect the interest of the government through determining "the over-all reasonableness of proposed settlement agreements."

Settlement of Subcontractor Claims

Contracting agencies may authorize prime contractors to settle the claims of subcontractors. The prime contractor need but certify that he is satisfied that the subcontractor's claim is just and reasonable.

The claims of the prime contractor and of the various subcontractors can be forwarded and settled without relation to each other.

A prime contractor's settlement with a subcontractor is subject to review by the contracting agency. But, if the contracting agency is satisfied that the prime contractor is reliable and has settled the claim in a manner compatible with the public interest, it "shall limit or omit its review of such settlement."

When approved by the contracting agency, a prime contractor's settlement of a subcontractor's claim is as final and conclusive as to the amount due as an agency-made settlement.

If the subcontractor is not satisfied with the settlement accorded by the prime contractor, he may appeal to the contracting agency concerned and thereafter negotiate his settlement with that agency. Then the agency takes over the subcontractor's claim against the prime contractor.

If a prime contractor goes bankrupt, after receiving settlement but before paying his subcontractors, the contracting agency is authorized to make payment to the subcontractors of the amounts due them. Then the contracting agency assumes their claims against the prime contractor and occupies a preferred position in the list of his creditors.

Appeal

If the settlement accorded a contractor does not suit him, he may either appeal to the Appeal Board the Director is ordered to establish, or bring suit against the United States in the Court of Claims or in a U. S. district court. Or, if the contracting agency has set up machinery to hear appeals within the agency, the contractor may, at his discretion, first resort to this.

If the contracting agency is a corporation owned or controlled by the United States government, the suit shall be brought against it as against any privately owned corporation.

Appeal must be made within 90 days of receiving advice of the findings of the contracting agency or of the appeal facility of the contracting agency.

If these findings are not delivered, he may demand them and—any time within one year—carry his protest to the Appeal Board or bring suit in the appropriate court.

Should the Appeal Board find that a contractor has not negotiated with the contracting agency in good faith, or that he failed to furnish any information reasonably requested, or failed diligently to follow appeal channels properly provided, it may do any of three things: 1. refuse to receive as evidence any information not previously submitted to the contracting agency; 2. deny interest in the claim or part thereof for such period as it deems proper; or, 3. return the case to the contracting agency for further proceedings upon such terms as the Appeal Board or court may prescribe.

Material Removal and Storage

Sixty days after the inventory of surplus materials applicable to a terminated war contract has been submitted to the contracting agency, "or such shorter period as may be prescribed under this Act," the agency "shall" become financially responsible for its storage. The agency shall arrange with the contractor to store the surplus in his own plant, for which he shall receive compensation, or shall remove it elsewhere.

If the surplus has not been removed in 60 days, the war contractor may store it in his own plant or remove it else-

where for storage, at the risk and expense of the government, "using reasonable care for its transportation and preservation." At least 20 days before the date set for removal of the surplus, the contractor is required to give written notice to the government agency of his intention; the notice shall include a certified "statement showing the quantities and condition of the materials to be removed."

If the contracting agency does not check the removed materials, "at or before the time of their removal," a contractor's statement, filed within 30 days after removal and specifying that the materials were removed as per previously announced list and intention, shall stand as "prima facie evidence . . . as to the quantities and condition of the materials so removed, and the fact of their removal."

The contracting agency, or the Director of Contract Termination, or any agency he may designate, may take over any termination inventory, of any war contractor. The agency then has the choice of returning this, or like, materials to the contractor, or of paying him its disposal value at time of removal, or of paying him the proceeds realized by the government from its disposal. An amount so paid or payable is creditable against the termination claim.

Removal of Government-Owned Machinery

The contracting agency is required to remove government-owned machinery, tools and equipment within 60 days after the contractor has demanded its removal, unless the agency and the contractor, "by facilities contract or otherwise, have made or make other provisions for the retention, storage, maintenance, or disposition" thereof.

If the government agency fails to remove the machinery within 60 days, the war contractor may remove it and store it on his own premises or elsewhere, "for the account and at the risk and expense of the government, using reasonable care for its transportation and preservation."

Quick Removal of Surplus Inventory

A contractor need not await the passage of 60 days after the submission of inventory of surplus material to proceed with removal and storage of such material. He may do so at any time prior thereto, but at his own risk.

Preservation of Records

All records of a contract of $25,000 or more must be preserved for five years. All records of both the purchaser and the seller of termination inventory of $5,000 or more must be kept for five years.

The five year period begins with 1. disposition of termination inventory, or, 2. final settlement, or, 3. termination of hostilities, whichever period is longer.

With the permission of the Director, such records may be destroyed, "upon such terms and conditions as he deems appropriate, which may include the making and retaining of photographs or microphotographs."

ITEMS *NOT* ALLOWED IN SETTLEMENT

Items which are, as a class, not admissible to consideration in claims for settlement:

1. Losses on other contracts, capital structure losses, antitrust or Federal income-tax-litigation, or prosecution of Federal income-tax claims or other claims against the government;

2. The expense of reconversion to other production;

3. Expenses due to negligence or willful failure of the contractor to discontinue with reasonable promptness the incurring of expenses after the effective date of the termination notice; and,

4. Costs due to producing more than the contract calls for.

Priority to Contractors

Priority in speedy making of termination settlements is to be given to "contractors whose facilities are privately owned or privately operated."

Determining Compensation

Contracting agencies are given the responsibility of establishing "methods and standards, suitable to the conditions of various war contractors, for determining fair compensation." The accounting systems used by war contractors, if consistent with recognized commercial accounting practice, are satisfactory bases for determination.

Advance Notice

Contracting agencies are ordered to provide termination notices to their prime contractors "as far in advance of the cessation of work . . . as is feasible and consistent with the national security without permitting unneeded production."

The agency is also to provide procedures for speedy notification by primes of their subs.

The agency is empowered to "permit the continuation of some or all of the work under a terminated prime contract whenever the agency deems that such continuation will benefit the government or is necessary to avoid substantial injury to the plant or property."

Work Suspension

If a contracting agency directs a contractor to cut down his output or to suspend work, but does not terminate the contract, it is obligated to pay him "for reasonable costs and expenses resulting" therefrom. If the suspension continues "for thirty days or more, the contractor may elect to treat it as a termination by delivering written notice . . . to the contracting agency, at any time before the contracting agency directs" resumption of work.

Across the Board Settlements

The Director of Contract Settlement has the power to order the settlement by a single agency of a group of contracts between a single contractor and several agencies or divisions thereof.

Interest

Interest at the rate of 2½ percent a year is payable on all unpaid prime contract claims for the period beginning 30 days after the date fixed for termination and ending with the date of final payment. This provision does not apply 1. if the prime contractor unreasonably delays settlement, or, 2. if the contractor appeals or sues, unless settlement is increased as the result of the appeal or suit. Should the contractor have been granted an interest-free advance payment or loan, made or guaranteed by the government, to tide him over the pre-settlement period, the interest thus waived is chargeable against the interest that may accrue to his credit due to slow claim settlement.

Successful Planning For Contract Termination

BY LAWRENCE A. HARVEY, VICE-PRESIDENT & CHAIRMAN OF BOARD, HARVEY MACHINE COMPANY

Presentation of claims within a few weeks after termination is possible with a smoothly operating termination committee. Numerical classification of charges arising after termination also helps to complete data for final settlement

WE REALIZED months ago the grave importance of our getting prompt and equitable settlement of our contract termination claims, and we began to prepare for the time when a major portion, or all, of our war work would come to an end.

First, we caused an intensive study of the subject to be made by those of our officers and department heads who would be directly involved. This study has been continued as new regulations are promulgated.

Our next step was to organize a termination committee, consisting of our comptroller, purchasing engineer, purchase coordinator, sales manager, factory manager, factory superintendent, and the head of our production control department. The comptroller is chairman of this committee.

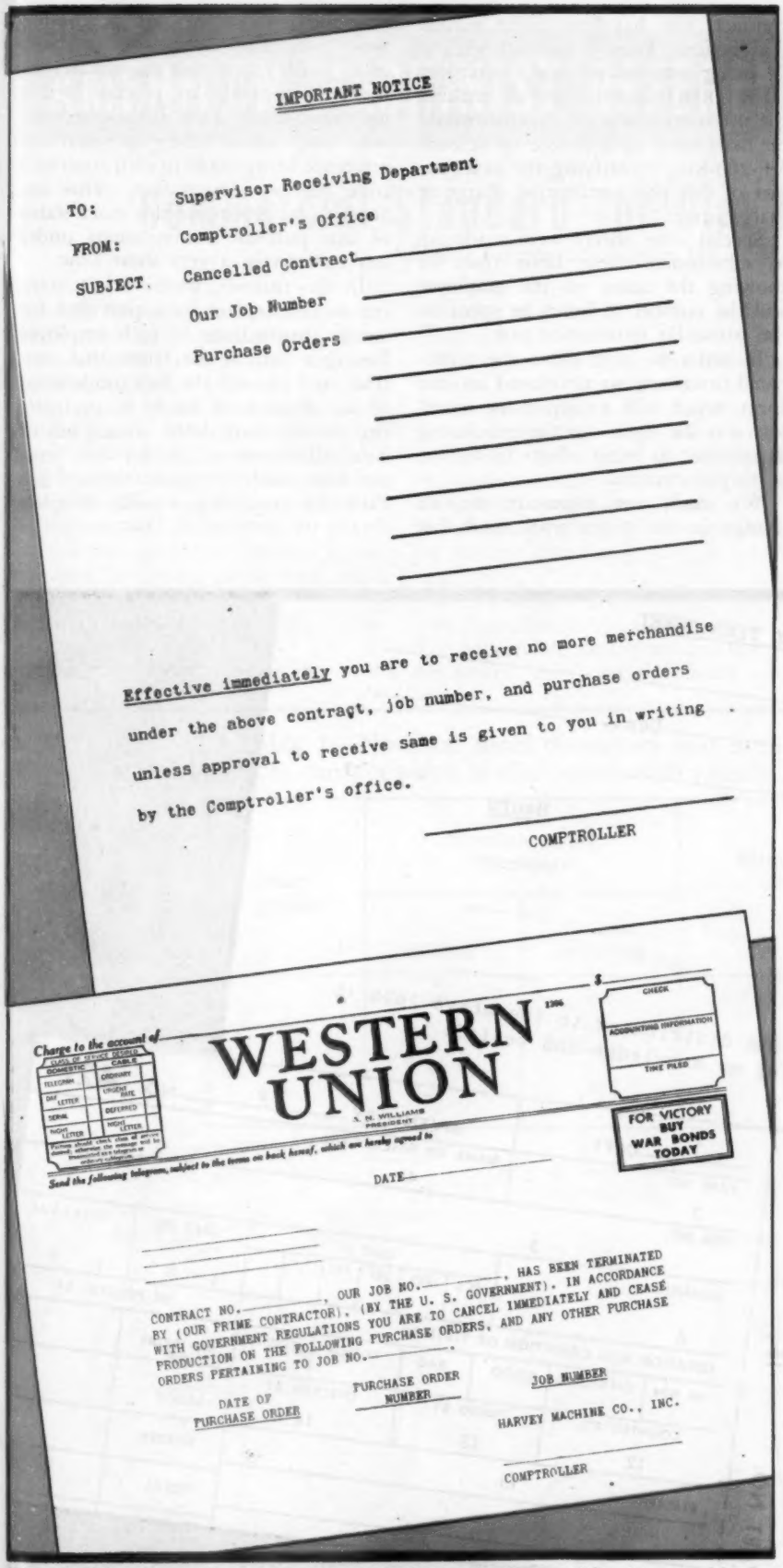
This committee made a detailed study of the problems, and consequent duties of each department, and a completed procedure was established for every phase of termination, and this procedure has been followed in handling the terminations that we have had. It has worked easily and smoothly. Our claims, which have ranged from four-figure to six-figure amounts, have been submitted promptly, not more than a few weeks being required in any case, and have been allowed without reduction. This convinces us that for our needs, at least, there are no serious errors in our system.

Our procedure may be outlined briefly as follows:

1. Stop work immediately on termination, if it is in the interests of the government for us to do so;
2. Cancel subcontracts;
3. Secure claims from subcontractors;
4. Take inventory of raw material, purchased parts, work in process and finished goods pertaining to the cancelled contract;
5. Segregate this inventory, physically, including any government property being used on cancelled work;
6. Circulate the inventory among potential purchasers;
7. Prepare cost records for the cancelled contract, for labor, material, and factory overhead;
8. Allocate the proper share of general overhead to the cancelled contract;
9. Segregate and record post-cancellation charges for the cancelled contract, including proper overhead;
10. Provide for removal and storage of excessive surplus inventory caused by the cancellation.

In connection with the first step, there often is appreciable advantage to the government in the completion of a considerable portion of the work in process. Representation of all our departments on the termination committee has enabled us to bring this to the attention of contracting officers promptly. If a portion of the work is to be completed eventually, it is highly advantageous to the government

View of the Harvey Machine Company, Los Angeles plant



IMPORTANT NOTICE

TO: Superviser Receiving Department

FROM: Comptroller's Office

SUBJECT. Cancelled Contract

Our Job Number

Purchase Orders

Effective immediately you are to receive no more merchandise under the above contract, job number, and purchase orders unless approval to receive same is given to you in writing by the Comptroller's office.

COMPTROLLER

Charge to the account of

WESTERN UNION

J. N. WILLIAMS PRESIDENT

CHECK

ACCOUNTING INFORMATION

TIME FILED

FOR VICTORY BUY WAR BONDS TODAY

Send the following telegram, subject to the terms on back hereof, which are hereby agreed to

DATE

CONTRACT NO. _____, OUR JOB NO. _____, HAS BEEN TERMINATED BY (OUR PRIME CONTRACTOR). (BY THE U. S. GOVERNMENT). IN ACCORDANCE WITH GOVERNMENT REGULATIONS YOU ARE TO CANCEL IMMEDIATELY AND CEASE PRODUCTION ON THE FOLLOWING PURCHASE ORDERS, AND ANY OTHER PURCHASE ORDERS PERTAINING TO JOB NO. _____.

DATE OF PURCHASE ORDER | PURCHASE ORDER NUMBER | JOB NUMBER

HARVEY MACHINE CO., INC.

COMPTROLLER

Fig. 1—These two forms permit prompt termination notification to Harvey Machine Company's receiving department and its suppliers. A form letter to suppliers verifies telegraphic instructions, tells suppliers to hold items involved in cancellation subject to further orders, to present termination charges in ten days, and to acknowledge receipt of the letter

that a decision to that effect be made promptly, so that the work may be completed in an orderly manner, preserving the flow of production as much as possible.

Special Forms Helpful

To help take these various steps promptly, we delevoloped six forms of our own for contract termination, which we use in addition to the forms prescribed in detail by governmental regulations. Forms 1 and 2 (see Fig. 1) are respectively used to notify affected supervisors that a contract has been cancelled and to notify our suppliers by wire to cancel purchase orders. Form No. 3 is a form letter confirming the telegram, and asking that the suppliers' claims be submitted within ten days. Instructions for submission of their claims are attached to this form.

In connection with the handling of termination inventories, we have found it possible to enlist the assistance of the government inspector assigned to the cancelled contract by acquainting him fully with our inventory procedure, so that he has frequently been in position to attest to our inventory as soon as it has been made. This greatly expedites the handling of claims.

Inventory Taking

A special inter-departmental memorandum was drawn up and run off on a duplicating machine to aid the taking of the inventory. The form has appropriate spaces to be filled in identifying the contract, the employees in charge of the particular inventory and other data, and contains instructions for the grouping of materials for tagging, the proper filling out of the tags, a definition of the classification of the work in different stages of processing, provisions for materials received after inventory, and the handling of inventories in the hands of suppliers.

To assure proper filling out of the inventory tags, which constitute a vital part of the inventory data, a separate brief set of instructions was run off showing a copy of the inventory tag with each item to be filled out numbered and a corresponding instruction for each number.

Since proper accounting records are of the utmost importance in successful handling of terminations, systems must be carefully examined before termination to make sure of the accurate and prompt carrying out of steps Nos. 7, 8 and 9, referred to in the foregoing text. It may be necessary to institute new sub-accounting methods that will give the detailed information required. In the case of our com-

pany, this was one of the more pleasant tasks involved in preparing for termination because we found that our numerical classification of accounts was nicely suited to give us the segregation of charges, the nature of them, and the allocation of those charges to each contract.

Post-Termination Charges

Particular care must be given to the identification and recording of post-termination charges. In this connection we developed another form assigning numbered identification for each type of expense that may be involved in post-termination operations. For example, crating labor was designated as 817; storeroom labor 816; clerical charges for the accounting department 821; and so on. Each of our contracts also has been given a code designation. Thus, if contract VP-200 is being terminated and storeroom labor (816) is employed in making the inventory, then the expense would be designated as a charge to account VP-200-816, identifying the exact nature of this post-termination charge to that contract.

Special time sheets were made up to substantiate these labor costs by showing the name of the employee and the number of hours he spent on the particular termination task.

In order to help move the terminated inventory, we developed another form, which with a copy of the inventory was the signal for the purchasing department to begin efforts to dispose of surplus material.

We made one important over-all change in our paper work, and that was the division of our purchasing order files into two sections, "live" and "dead," according to whether an order is currently in process or has been completed. Each of these sections was then sub-divided, by contracts, reference being made to each contract's code number designation. This enables us to determine the exact status of our purchase commitments under any contract in a very short time.

In this manner, we have left nothing to chance, but have provided for specific instructions to each employee having a part in the terminated contract, and secured the full cooperation of all department heads in performing the necessary detail arising out of a cancelled contract. At the same time, we have made the government's job easier by supplying it with complete details on termination claims.

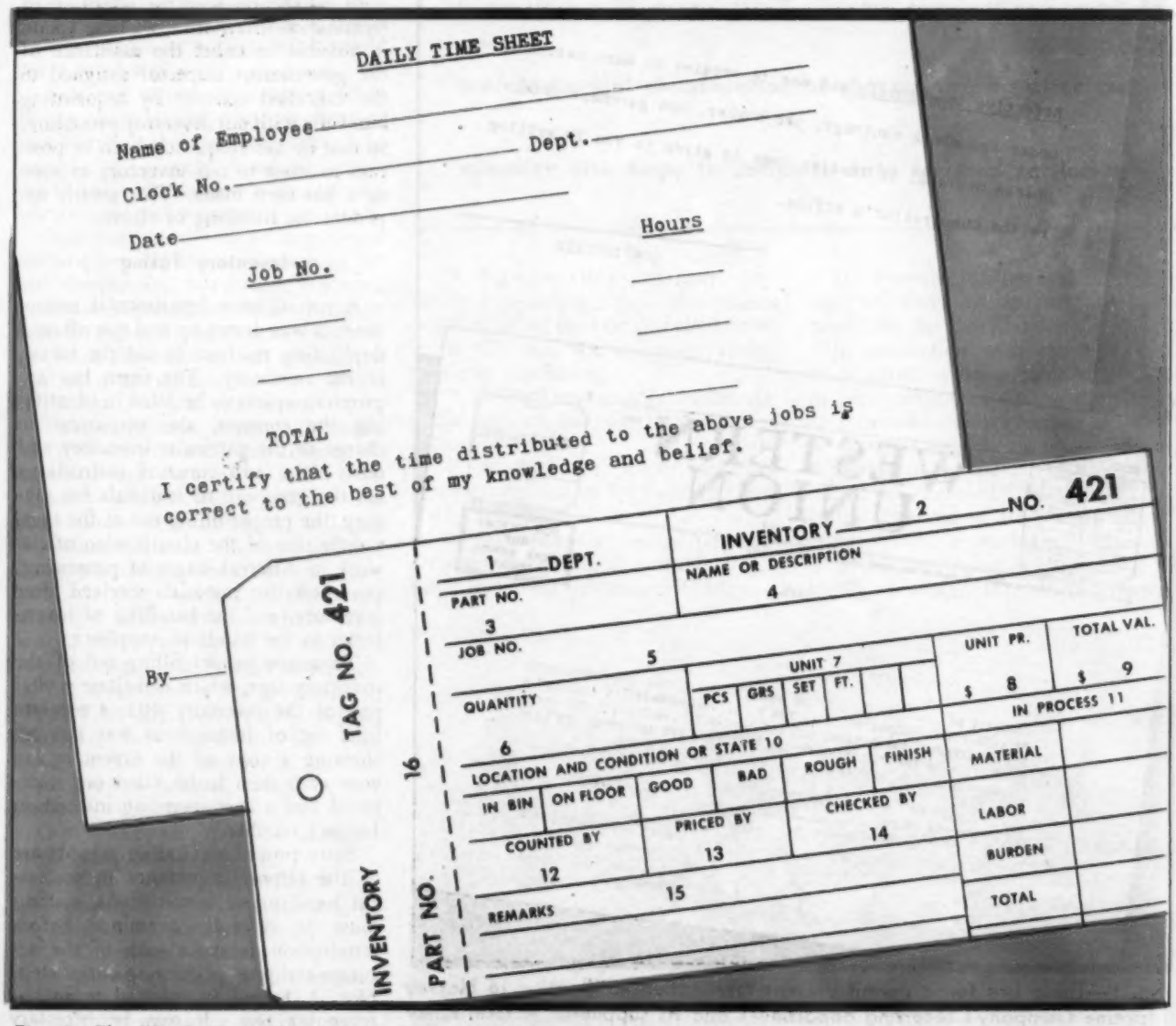


Fig. 2—The "Daily Time Sheet" helps keep track of post-termination labor charges. Numbers on inventory tag shown are only used to instruct workers on how to properly fill them out, and do not appear on tags regularly in use to aid termination inventory segregation and proper identification

Commercial Standard for Dial Indicators—I

Effective for production from Jan. 1, 1945

LEADING USERS, Government agencies, distributors and manufacturers have approved the commercial standard for dial indicators [CS (E) 119-45] promulgated by the U. S. Department of Commerce through the National Bureau of Standards. Purpose of the standard is to provide minimum essential requirements for precision dial indicators.

Four size groups are covered in the standard, according to nominal bezel diameters:

Group 1—From above 1⅜ in. to and including 2 in.

Group 2—From 2 to 2⅜ in.

Group 3—Above 2⅜ in. and including 3 in.

Group 4—Above 3 in. and including 3¾ in.

These groups have dial markings as follows: English measure—0.00005 in.; 0.0001 in.; 0.0005 in. and 0.001 in.; metric measure—0.001 mm., 0.002 mm., 0.005 mm. and 0.01 mm.

For the purposes of the standard, the nomenclature shown in Figs. 1 to 4 shall apply.

This standard covers only the American Gage Design type shown in Fig. 1. The appropriate monogram consists of the letters "AD", the right-hand side of the "A" and the straight side of the "D" being common.

Materials specifications are: (1) the contact surface of contact points shall be of suitable material to provide a smooth durable surface, and (2) dial faces shall be clear and legible.

Detail requirements are as follows: length of contact point, distance between spindle axis and center of lug hole, diameter of lug hole, thickness of lug and diameter of stem (identical for all sizes) shall be as shown in Fig. 1. Spindle travel or range shall be a minimum of two and one-half revolutions of the indicating hand, unless

Table 1—Nominal bezel diameters and minimum distance from contact point to dial center with spindle fully retracted

Size group	Nominal bezel diameters		B Minimum position See Fig. 1
	Above	To and including	
	in.	in.	in.
1	1⅜	2	1⅝
2	2	2⅜	2
3	2⅜	3	2⅛
4	3	3¾	2 9/16

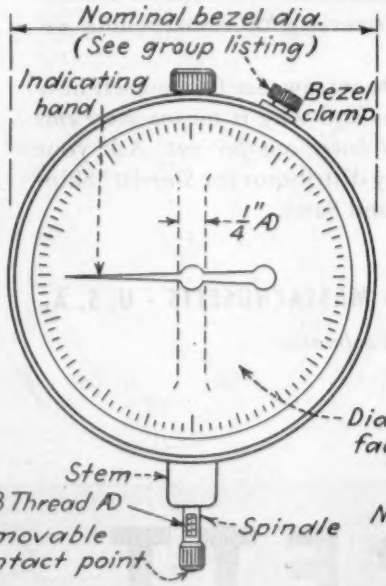
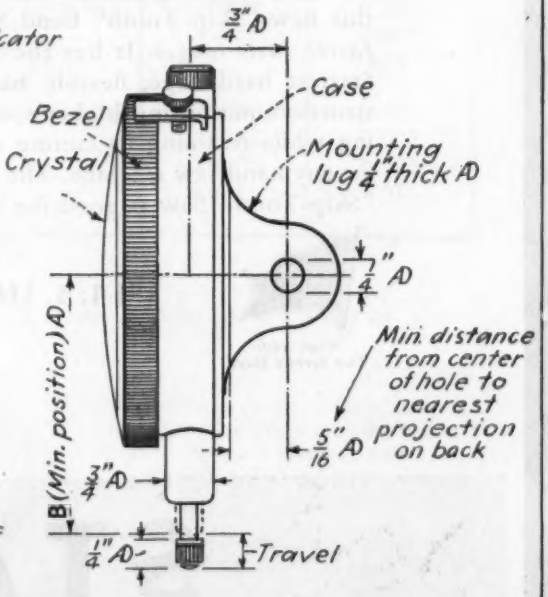


Fig. 1-AD dial indicator standards

Note: Travel of spindle equals a minimum of 2½ turns of hand in all groups AD



STARRETT BAND SAWS

STARRETT presents the new "Skip-Tooth" Metal Cutting BAND SAW

for fast cutting of:

MAGNESIUM . . . ALUMINUM . . . BRONZE . . . SOFT BRASS and other non-ferrous metals; also for special compositions, fibre, bakelite, plastics and wood.

Like all Hacksaws and Metal Cutting Band Saws bearing the STARRETT name, this new "Skip-Tooth" Band Saw *cuts faster, lasts longer.* It has the regular Starrett hard edge, flexible back construction, permitting higher speed sawing while retaining its cutting edge. It fits any band saw machine. The Starrett "Skip-Tooth" Saw is good for a whole lot of clean, high speed cutting. Use it until it's worn out. Then put in another one. No resetting or resharpening expense.

Try this new saw. See for yourself how it performs and why it means *more cuts per saw at lower cost per cut.* Ask your mill supply distributor for *Starrett* "Skip-Tooth" Band Saws.

Now, with Two Service Stars

THE L. S. STARRETT CO. · ATHOL · MASSACHUSETTS · U. S. A.

World's Greatest Toolmakers

STARRETT

PRECISION TOOLS • DIAL INDICATORS • GROUND FLAT STOCK
HACKSAWS • METAL CUTTING BANDSAWS • STEEL TAPES

Commercial Standard for Dial Indicators—II

specified for special applications requiring greater travel. The indicating hand shall be set at the approximate 9 o'clock position (¼ revolution to the left of zero) when the spindle is fully extended. Size group, limits for nominal bezel diameters and corresponding minimum position distances along the spindle axis, between contact point and center of dial, shall be as shown in Table 1.

Dial markings indicating the value of the smallest graduations shall be in four classes, Table 2, which shows the combinations of dial sizes and markings regularly available. These dial markings, both English and metric measure, shall indicate the smallest value of the graduation of the dial, and shall be in decimals, e.g., 0.001 in., not 1/1000 in.

Dial numbering: on English measure dials, the dial numbering shall always indicate thousandths of an inch, irrespective of the class of dial marking. On metric measure dials the dial numbering shall always indicate hundredths of a millimeter, irrespective of the class of dial marking.

The degree of repetition and accuracy varies with the magnification factor of the dial indicator and the magnitude of the difference measured. Therefore, the values established below are to be considered only as maximum tolerances:

Repetition of readings—Readings at any point shall be reproducible through successive movements of the spindle to plus or minus one-fifth graduation.

Accuracy—The dial indicator shall be accurate to within one graduation plus or minus at any point from the approximate 10 o'clock position to the final 2 o'clock position (2 1/3 turns).

Dial indicator cases shall be of such strength that free movement of the mechanism is maintained under conditions of normal use. Unless otherwise specified, a movable dial with suitable clamp shall be furnished.

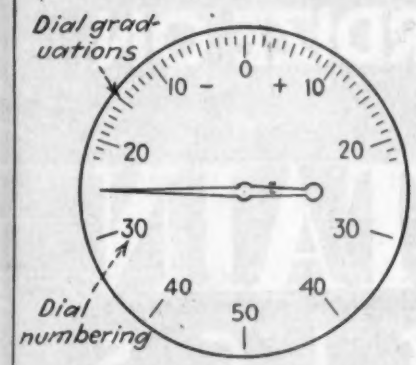


Fig. 2—Balanced dial showing specimen numbering

Balanced dials will be furnished in all sizes and classes unless continuous reading is specified by the purchaser

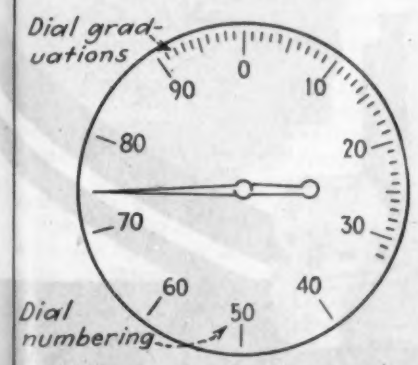


Fig. 3—Continuous dial showing specimen numbering

When specified by the purchaser continuous reading dials will be furnished in all sizes and classes

Table 2—Dial sizes and classes of markings

American Gage Design group	Bezel diameters	English measure	Metric measure
	in.	in.	mm.
1	1 3/8 to 2	0.0001	0.005
		0.0005	0.01
		0.001	
2	2 to 2 3/8	0.00005	0.001
		0.0001	0.002
		0.0005	0.005
		0.001	0.01
3	2 3/8 to 3	0.0001	0.001
		0.0005	0.002
		0.001	0.005
			0.01
4	3 to 3 3/4	0.00005	0.001
		0.0001	0.002
		0.0005	0.005
		0.001	0.01

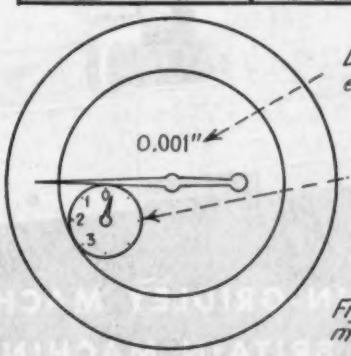
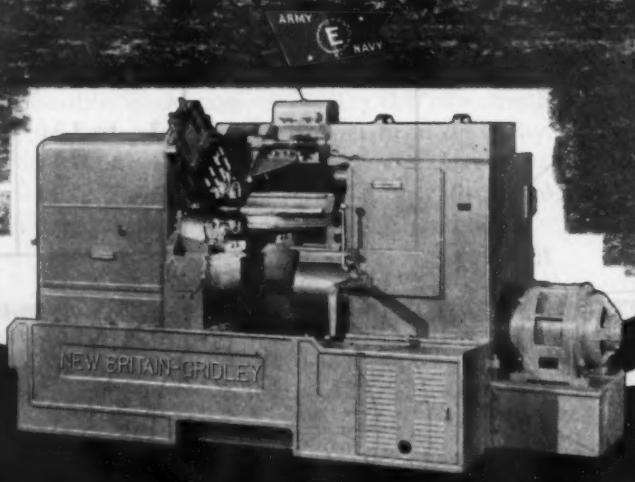

Dial marking, located to suit each manufacturer's practice
0.001"
Revolution counter, optional extra for all sizes and classes, located to suit each manufacturer's practice
1
2
3

Fig. 4—Dial showing specimen dial marking and revolution counter

..HIGH SPEED
Continuous Performance

YOU GET BOTH
WHEN YOU STANDARDIZE ON

NEW BRITAIN
AUTOMATICS



NEW BRITAIN-GRIDLEY MACHINE DIVISION
THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT

Gaging Business

The Future Brightens

Industry's prospects for the period between the end of the European War and the end of the Japanese War seem somewhat brighter now that numerous uncertainties in the situation have been cleared up. War orders are to be cut 40 percent within 90 days after the end of the war with Germany, and a further 20 percent cut is slated during the following 90-day interval. At the same time, industry has been promised fewer government controls to help aid reconversion of its freed facilities to production of civilian goods.

Fears of log-jams in purchase orders for some materials and components after V-Day are somewhat offset by the fact that different plants in various industries will require anywhere from one day to six months to reconvert, so that pressure for immediate deliveries should be mitigated for this reason. Further relief to materials and components suppliers will be forthcoming from inventories of items that will not be required after the initial 40 percent cut. Thus, reconversion may work out somewhat more smoothly than some people think. Some bottlenecks and sore spots are inevitable, but indications are that in such cases the government will help to unsnarl industry's difficulties.

Conversion Mapped

However, for many months now various industries have been making plans to reconvert after V-Day. The auto industry has met with its suppliers and made some tentative arrangements, in addition to having settled with the Army on just which orders will have to be taken out of the auto plants on V-Day to permit the industry's estimated minimum possible output of some 2,000,000 automobiles. At the same time, manufacturers of some 19 groups of durable goods, including stokers, electric refrigerators and washing machines, have been given conditional permission by the government to resume production before V-Day, if and when they have the materials and manpower available.

Some 125,000 tons of steel has been allocated for "spot" authorization cases with preference being given to small plants, especially hardship cases, and to producers of civilian goods regarded as Preferred Products by the government. In addition, such producers can apply for allocations of the 15,000,000 pounds of copper and copper-base alloy and 57,500,000 pounds of aluminum set aside for reconverting small companies.

It will pay all manufacturers to get on the order books of their suppliers in advance of V-Day: the government promises not to interfere with the position of such orders after V-Day.

Despite the expected unemployment of some 4,000,000 war workers as a result of V-Day cuts, industry's sales prospects are regarded as favorable particularly in view of the $100,000,000,000 in wartime savings accumulated by the nation. Moreover, the unavailability of civilian durable goods for several years past indicates a sustained favorable demand which some optimistic observers feel may last for five years.

See Little Steel Crack

The major uncertainties in the business situation are prices and wages. The "Little Steel Formula," limiting wage increases to the 15 percent rise in living costs from January 1, 1941, to September 15, 1942, is expected to be cracked by the CIO Steel Workers' demands for a further rise to offset advances in living costs since the latter date. The union is seeking a 17-cents-an-hour increase over the current hourly rate of $1.07, which is 26 percent above the January 1, 1941, rate of 85 cents. The union claims that the cost of living has risen 44 percent since January 1, 1941, whereas the Bureau of Labor Statistics reports that living costs rose 25 percent since that date. However, the fact that living costs have advanced since the "Little Steel Formula" was laid down, despite the administration's expressed determination to "hold the line" on price, is reported to be pointing to the probable granting of an increase of around eight cents, as a "compromise." It is pointed out that usually the War Labor Board "compromises" labor's demands by granting about half of what labor asks for.

Effect Will Spread

If the "Little Steel Formula" is broken, then wage adjustments will have to be made all along the line in various industries. In many of them this will necessitate adjustments in selling prices of products turned out. Since OPA has indicated that it is developing a formula for price increases on civilian goods produced after V-Day, there is some hope here that industry can get some relief from the higher wage costs. However, this will only set in motion once more the cost-of-living index and keep the vicious circle of wages and prices going. OPA's pricing formula may attempt to keep prices down to the 1942 level.

NEW CAR DOWN UNDER

LONDON—A family car designed by Australian engineers, and to be built in Australian factories will be ready for the road within a year after the end of the war. Cost is estimated to be about $1,200. It will be built by General Motors Holders Limited.

Tool Orders to Rise

In view of auto industry orders, new machine tool business may show a recovery in September, over the recent slump in net new orders. The industry is now handling about $15,000,000 worth of non-tool business monthly, but about 30 percent of its capacity remains idle. Aside from military work, non-tool business includes truck parts and rubber-making machinery. It is reported that some companies in the industry will attempt to capitalize on wartime contracts to secure postwar business for parts orders for automobiles and refrigerators.

Meanwhile, most companies are readying new machine tools to be launched to get the postwar business. The current sales of government-owned used tools are regarded favorably by some industry observers who feel that this is better than allowing them to overhang the market.

Quintuple Copper Rods

The major bottleneck in copper has been in large size tubing and rod, due to increased requirements for the artillery program. By the end of the year, planned expansion of rod production may raise monthly output to 100,000,000 pounds from recent capacity of 20,000,000 pounds.

The depletion of our highest grade copper ore deposits indicates that prices for copper may have to go higher after teh war. However, the availability of large supplies of scrap and possible dumping here of Latin-American copper over the 4-cent tariff spells difficulties for the industry that may not be easily resolved. Aluminum and magnesium will not be in sufficient demand, even with widespread usage in civilian products, to take up the slack resulting from reduced requirements in aircraft building. It is reported that the aluminum stockpile may amount to 1,000,000,000 pounds by the end of the war.

Latest war production bottleneck is in cotton duck for use in making tents, and this now joins the other two critical situations, heavy tire production and forgings and castings. The forgings and castings situation may be eased by import of Bahamian labor to work in forge shops and foundries, while the heavy tire picture has been slightly aided by release of about 300 men from the armed forces to work in the tire plants.

Agency Reconversion Planning Announcements are Conflicting

WPB plans to lift materials control, while assuring small businesses supplies; McNutt says 48-hour week will go on, but Byrnes' reconversion report say it will not

WASHINGTON—Most hopeful sign for business in the midst of numerous "reconversion planning" announcements from Washington is that WPB plans to remove most of its controls over materials and components shortly after the defeat of Germany, except for tight items such as lumber, textiles, and certain chemicals. Further encouragement was also forthcoming by promises from the War Manpower Commission that most manpower controls will be lifted, the statement by Byrnes, Director of War Mobilization, that OPA price ceilings for civilian products would be adjusted to allow for increased costs.

Unfortunately, Byrnes and the WPB have indulged in some contradictory statements on the subject of reconversion, which would seem to indicate a lack of specific planning and an excess of optimistic announcements. For example, on September 8 before the Senate War Investigating Committee, Paul V. McNutt said that the 48-hour week would be maintained after V-Day, while Byrnes' report to the President on reconversion, dated September 7, stated that we should return to the 40-hour week after V-Day. At the same time, the Byrnes' plan mentioned that the post-V-Day controls would only represent a new military preference rating, and a civilian preference rating, while WPB's report specifically states that no provision will be made for ratings for civilian products.

Control Only Where Needed

It was also confusing to some observers how WPB could lift most controls and yet "make certain that no one procures an unreasonable amount of materials, that needed materials and components are made available to essential civilian activities, and that small business is given an opportunity to secure materials and supplies." WPB officials explained to AMERICAN MACHINIST that this would be possible by observation of the general over-all picture by WPB's Industry Divisions and Requirements Committee, and that WPB could act in cases where lack of certain materials or components was preventing the operation of a plant causing unemployment.

The lengthy Byrnes' reconversion report contained much material that had been previously made public, such as the essence of the contract termination law, the method by which WPB's Production Executive Committee goes about selecting cutbacks, the proposed lifting of manpower controls, the Navy's plans to do very little cutting in orders after V-Day and the Maritime Commission's plans to do some cutting then. New data included the pending OPA formula providing for price increases on civilian goods to compensate for increased costs, plans for possible use of government plants to prevent abnormal unemployment in some areas, a planned 50 percent reduction in future orders for strategic reserve supplies, a recommendation to allow manufacturers an increased depreciation rate on new machinery as is being done in England, and an appeal to Congress for higher unemployment compensation.

One of the most surprising statements in the Byrnes' report was "Unemployment compensation is our first line of defense against unemployment."

TO EASE EXPORTS AND IMPORTS

WASHINGTON—The War Production Board is reported to have taken steps toward the removal of export and import controls to the greatest extent possible after the collapse of Germany. In this connection, WPB has established liaison with the Foreign Economic Administration and the State Department, and conversations along such lines have already been held. Up to the present time, exporters and importers continue to be beset by involved regulations and restrictions despite favorable foreign business prospects.

War Production Cutbacks Rise; Released Workers are Diverted

WASHINGTON—The September volume of cutbacks in war production, as approved by the War Production Board's Production Executive Committee, is expected to be ahead of August's total of $205,666,000. The latter total would have been higher had it not been for the fact that some large cutbacks before the committee in August were not passed upon until September 1st and September 4th. In any event, August's reductions in war production released 33,307 workers, as against only 14,925 released during the June 15-July 31 interval, which was the first period covering the PEC's activities.

PEC reports that most of the released workers have been diverted into other war work, and that 67 percent of the production slashes did not affect the working force but were largely paper cuts. The underlying odjective of the PEC seems to be the overcoming of the spot shortages of about 200,000 workers in various war plants by trying to utilize the surplus workers in "easy" labor areas, put at about 1,000,000 men.

North American Hard Hit

Right now the PEC is trying to get labor is tight, to place the work in the some airplane parts business out of Southern California plants, where Dallas plant of North American Aviation which was recently hard hit by production cuts. Thus far, North American has not had enough substitute work to take up the labor slack.

The stepping-up of the "Corsair" plane business for Akron, which was strongly criticized because Akron is such a critical labor area, has been rescinded, and the additional business has been taken out of Akron.

Plans provide for cutting the Maritime Program at the end of the German War, but it is reported that the Maritime Commission plans to complete every ship for which a keel has been laid by V-Day.

Plan Used Equipment Credit

WASHINGTON—To stimulate sales of government-owned used equipment, the Defense Plant Corp. has announced plans to offer credit terms for purchasers unable to pay cash for such items. Minimum down payment will be 15 percent of the selling price with the balance payable over five years. Interest on the unpaid balance is payable at four percent per annum. However, sales and credit arrangements are limited to "purchasers for use."

The scheduled dissolution of WPB's Redistribution Division will be accompanied by the cessation of publication of WPB's "Redistributor," issued by WPB district offices and listing available used equipment in each area. Since the publication was so helpful to purchasers of used equipment, it is believed that the Surplus War Property Administration may issue a similar bulletin. In the meantime, the Army and Navy are making considerable progress toward making a comprehensive listing of surplus equipment which they own and which is still in operation or in storage.

Inside Detroit

WMC Talks Reconversion

Under lowering labor skies, the War Manpower Commission met last week with heads of the automotive industry to define and agree upon the second big step in preparation for the partial reconversion of the industry to civilian production. As far as actual production is concerned, there is as yet no slackening of war manpower regulations. What the automotive chiefs came away with from this meeting was permission to put a limited number of draftsmen and specifications-writers to planning cars which would not differ essentially from the models of 1942.

These specialists may be transferred from "non-urgency" war work. The planning for which they are released, however, must fall within the ambit of agreements reached in and before the meeting. These, for the most part, were boiled down at the close of the meeting to five simple points:

1. Any known weaknesses or errors in 1942 models may be corrected.
2. Materials specifications may be changed in accordance with changes in the materials situation.
3. Plant lay-out may be included in the planning.
4. Minor changes may be made in the appearance of the cars.
5. Related preparatory work is permitted—such as planning for machine tool reconditioning.

Until the manpower position and requirements of each company can be given individual consideration with a view to determining just how many specialists may be transferred to this work, a tentative limit of 1 percent of the individual company's employment ceiling has been set.

See Progress Made

On the whole the industry appeared quite satisfied with the outcome of the meeting. Most of the representatives seemed to feel that significant progress had been made and that the one-per-cent allowance was more than adequate for some weeks at least.

Said George W. Romney, managing director of the Automotive Council, "The biggest problem the industry has to face in order to be ready to reconvert quickly enough when the time comes is getting government officials in the field sufficient authority to act." Mr. Romney thought a valuable precedent had been set by Mr. Cushman's taking the initiative to present this plan for a preliminary reconversion step to Washington and getting authority to act on it as he did.

As an example of the slowness of government agencies in acting to remove obvious barriers to reconversion, Mr. Romney mentioned the machine tool pricing formula of July 14th, which, he said, was not yet in the hands of machine tool dealers and was not expected to be until some time in October. Two other steps which are long overdue, he continued, are concrete planning for plant clearance and granting of permission to machine tool builders to go ahead on automotive orders released after August 15th—to go ahead, that is, wherever such work would not interfere with "high-urgency" war orders.

Mr. Vance of Studebaker did not attend the meeting. One persistent rumor—officially unsubstantiated—has it that Studebaker applied to the Washington office of WPB for permission to put specialists on the job of planning a new car. This permission was refused, the rumor continues, because the other companies pointed out that it was stealing a march on them.

"No-Strike"—Temporarily

Meanwhile, toward the end of a series of stormy sessions at Grand Rapids, Michigan, the national convention of the UAW-CIO voted to uphold the no-strike pledge—but only temporarily. The results of a referendum mailed to the entire membership during the next ninety days will determine whether or not the Union will continue to adhere to the pledge.

Judging, however, by the temper of the delegates at the convention and by countless incidental signs of worker unrest—especially in the Detroit area—the decision will have no real importance. The labor kettle is boiling close to the top. Whatever the outcome of the referendum vote, there is every indication that the automotive industry may be racked with very severe labor pains during and before the rebirth of civilian automobile production.

The fight to repeal the no-strike pledge appears to have been primarily a struggle to knock the strongest prop out from under the International leadership rather than one prompted by the need to remove an obstacle to freedom of action. Without that moral support and the vote of Union confidence implicit in it, the leadership would theoretically lose some of its control over the less radical elements in the locals—control which had enabled International leaders to split striking locals over the back-to-work issue and so end strikes.

Will Flaunt Pledge

Failing in this tour de force, disgruntled radicals will certainly lose no opportunity to prove they don't care a fig for the pledge—especially since most of them look to the future with increasing apprehension and even alarm. Many subscribe to the fear that, as reconversion legislation stands now, the effectiveness of organized labor's only real weapon, the strike, will be reduced to nothing because managements (they say) will be able, when faced with strikes, to shut down their plants and "go fishing" while receiving an adequate stipend in the form of rebates from terminated government contracts. For that reason the radicals are all the more anxious to get in their licks now.

Hellcat on Treads—Finished Hellcats, new high speed heavy fire power combat vehicles of the Tank Destroyer Command, receive final inspection in a Buick Motor Division plant before final test runs. Speeds up to 55 m.p.h., with maximum performance in rough terrain and ability to outshoot and outmaneuver enemy tanks, are claimed by military technicians for the new tactical weapons, now in action in major war theaters. It has been in secret production at Buick for more than a year

Anticipator—Clinton R. Hanna, inventor of the gyro stabilizer which holds tank guns in aimed position despite pitching and rolling during travel, holds an early two-gyroscope model. He calls a later-developed one-gyro model the "anticipating gyro," because it corrects the aim for movement before it can take place. The gyro stabilizers are being produced by Westinghouse

Empire Industrialization Inspired By War; Assembly Plants Favored

LONDON—Industrialists and government officials alike realize it is inevitable that Colonies and Dominions, as well as nations heretofore considered industrially backward, will endeavor to build and operate factories for the production of consumer's goods, making them partially independent from nations like Britain and the United States. The creation of factories for the production of war equipment in these countries, as well as the realization that unskilled labor with the proper guidance and facilities can produce quality products, have given them an industrial incentive that they will not relinquish in postwar years. This is accentuated by a mission of Indian industrialists to Britain, who plan to raise and spend no less than 30 billion dollars for the erection of manufacturing plants, thereby starting a cycle wherein wages paid to workers in new factory enterprises create a greater demand for agricultural products, and in turn, farmers will receive money to purchase consumer goods made in the factories.

British Advocate Cooperation

The trend of thought in Britain, for the most part, is to cooperate in such projects, because eventually they will increase the productivity of the British Empire, spread Imperial prosperity, and minimize localized poverty in heavily populated countries like India. It is believed that industrialization in countries heretofore considered totally agrarian will be a slow process. Engineers and industrialists from such countries and Colonies are being advised that it would be dangerous if either private or public enterprise started out to manufacture complex consumer goods without production assistance from established organizations in Britain and the United States where engineering processes and research have been kept well in front of the rest of the world. They are being advised that nothing but disappointment might accrue from such a policy, because of the styling factor in engineering which demands constant change to match public taste, and that factories built overseas would be hard-pressed to establish production facilities, train labor, and strike a production rate that would match competition from nations already highly industrialized.

Industrialization Encouraged

Encouragement is given to the establishment of assembly factories for which machines, tools, jigs and fixtures can be obtained from Britain and America. Also, these countries could supply the necessary technical and engineering personnel, as well as major subassemblies, until, at some day in the future, the factories overseas can themselves start to manufacture the subassemblies in greater and greater quantities.

It is believed that in this way, ties between the British Empire will be bonded more closely, and that export interests of the highly industrialized countries consolidated. It is also believed that unless factories overseas are well conceived and adequately planned, with an eye to maximum and efficient production at some future date rather than in years immediately following the war, the ultimate products made in such factories will be out of date before placed on the mar-

Metal Congress to Inventory Gains and Plan Adjustments

CLEVELAND—An inventory of information and developments in the metal industry will be made in a series of 21 practical panel meetings sponsored by the American Society for Metals during the 26th annual National Metal Congress and War Conference Displays, Public Hall, here, October 16-20. These practical sessions will be in addition to the regular technical lectures of the Society.

Included among the subjects listed for discussion are: metal powders and products; metallurgical furnaces; induction heating; heat treatment; manufacture of quality steels; national emergency steels; surface peening; foundry metallurgy; quality control by statistical methods; salt baths; subzero treatments; surface finishes and protection; corrosion study; quality control instruments; tin and tin alloys; aluminum; magnesium; metal cutting and tool materials; and tools for inspection.

In addition to the American Society for Metals, sponsor of the event, participants in the Metal Congress are: The American Welding Society; the Iron and Steel Metals division, American Institute of Mining and Metallurgical Engineers; the American Industrial X-Ray and Radium Society; and, the Society for Experimental Stress Analysis. This is the first time the latter two societies have participated in the Congress.

ASM to Install Officers

Dr. Kent R. Van Horn, 39, research metallurgist for Aluminum Company of America, will be installed as president of the American Society for Metals. He will be the youngest man in the society's 25-year history to hold the top office. He steps up automatically from the post of vice president to which he was elected last year, and succeeds M. A. Grossman of the Carnegie-Illinois Steel Corp.

New Accuracy After War

LINCOLN PARK, MICH.—"Precision undreamed of before the war will be common in manufacturing after victory, and quality of peace-time products will get an uplift, plus an increase in output per man-hour of work because of new skills and practices." Such is the comment of George F. Eglinton, president, Lincoln Park Industries, here, summarizing his company's survey of leading manufacturers.

The survey showed that the organizational line-up throughout industry for the precision of manufacturing has been made for war production and will be utilized for peace production later. All corporations surveyed expressed anticipation of widespread improvement in peace-time products. The key to such improvement in nearly every case was greater precision and accuracy in production.

Wartime Washington

Knees of the Gods

Acting WPB Chairman Krug's realistic appraisal of the "reconversion job" is that only "God knows how to solve the many problems that may arise after V-Day." More than that, WPB's policy-makers feel that "it is none of WPB's business" if one company gets an advantage over the next one, except that WPB will come to the aid of bottlenecked plants and items, if such situations interfere with employment in such plants. That will be sole criterion of WPB "interference" after V-Day.

Present military plans point to a 40 percent cut in war orders within 90 days after V-Day, and a further 20 percent cut over the following three months. Moreover, it is reported that specific plans have been laid for continuation of a gradually diminishing military production program for a year after the fall of Germany. Meanwhile, WPB plans to remove most controls from American industry about two weeks after V-Day, except in some critical industries, such as lumber.

To those predicting widespread dislocations, forward-ordering, bottlenecks, and so on, when controls are removed, WPB says that its field offices will attempt to ease such conditions wherever they interfere with employment, but that it will not enter competitive battles.

Will Speed Authorizations

Krug seems to have taken nice hold on Don Nelson's job. He is straight-talking and apparently anxious to straighten out misconceptions and reply to criticisms. He emphasizes that the "spot authorization" plan has not been "junked," but that it will be improved and speeded up. Krug blamed the present slow procedure for the fact that only 61 of 1,100 requests for spot authorization permissions had been processed.

The fact that only 31 "spot authorizations" have been granted is blamed upon the War Manpower Commission's veto power in such situations, as well as the Army's apparent lack of cooperation with the spot authorization plan. The WMC is reported to be changing its attitude and may take a more liberal view, especially in easy labor areas. However, the Army is still trying to replace every cut-back in one war item with a contract for another item for such cut-back plants. Nevertheless, WMC's course is aimed at diverting war orders from tight areas to easy labor areas, the basis which actually is guiding most cut-backs. The Army would like to ignore this factor and be guided by the relative efficiency of various war contractors.

WPB Shift Works Smoothly

The Wilson-Nelson arrangement in handling WPB has now been divided up among three men, Krug, Batcheller and Bunker. Whereas Wilson was in charge of operations and Nelson in charge of policy, under the new set-up Batcheller is in charge of operations and Bunker is in charge of policy, with Krug supervising the work of both men. It is said that this scheme is working out very well, since Krug, Bunker and Batcheller are constantly apprised of what each is doing, and thus do not face the danger of misunderstanding that Nelson and Wilson did. The fact that Nelson is not coming back to the War Production Board is generally accepted.

It is reported that Batcheller was originally offered the job of being Krug's first assistant but turned it down. Subsequently, it is rumored that the pressure of his board of directors resulted in Batcheller compromising by returning to WPB with the understanding that his work would end when the war with Germany was over or at the end of 90 days, whichever is shorter. He has thus resumed his old job of vice chairman of the Office of Operations at WPB, succeeding L. R. Bouleware who recently resigned.

"X" MARKS V-DAY

WASHINGTON — By working overtime, Government word-coiners have come up with several substitutes for the word V-Day, which everyone has come to accept as the designation of the day when the war with Germany ends. However, Krug's initial statement as acting head of WPB referred to V-Day as "X"-Day, while Director of War Mobilization Byrnes in his reconversion report came up with two new designations, VE-Day signifying the day the war in Europe ends, and VJ-Day for the day when the war with the Japs ends. With V standing for Victory and E standing for Europe while J stands for Japan, everyone has been wondering what the WPB's X stands for.

Mixed Reactions to Report

The Byrnes "reconversion report" was met with mingled criticism and some favorable reaction. Criticism was leveled at the many uncertainties in the report, such as the section on prices, and the discussion regarding possible use of government-owned plants "to prevent unemployment." The report was also scored for omitting any mention of wages, which is regarded here as a vital factor during the reconversion period. Foreign trade was also left out. On the favorable side, was Byrnes' reiteration of WPB's promise to lift most controls over materials after V-Day and the WMC statement that manpower controls will also be withdrawn to a large extent.

A portion of the report which received considerable praise was Byrnes' recommendation that manufacturers be allowed an increased depreciation rate on new machinery, as is being provided for in England. It is pointed out that such government action would help to raise the equipment standards of American industry, promote the junking of old equipment now in operation due to depreciation considerations, and thus stimulate industrial activity by tending to increase general plant efficiency.

To Shrink with Control

Specific provision is being made for a gradual shrinkage of the War Production Board in line with diminishing controls. The Office of Defense Transportation is eliminating many field representatives, the Office of Civilian Requirements has cut its force by about 20 percent, and the Redistribution Division is slated to be liquidated entirely on October 15. Further resignations are expected, and even those top officials are definitely planning to leave Washington soon.

Red Credits Lag

It is reported that the Treasury Department has been trying to pressure various companies to get them to extend long-term credits for Russia. The Soviet is said to be seeking 5-year and 10-year credits, but having difficulty in getting favorable reception to such plans. However, the Treasury seems to be sponsoring favorable treatment of such offers. Thus far, only one instance of long-term credit sales to Russia has been uncovered by AMERICAN MACHINIST. Some mining equipment has been sold to Russia on such terms.

Withhold Ship Cuts

Although the Navy has announced that its military program will not be cut on V-Day, it is reported that Navy plans recently involved cutting about 49 warships out of its program. However, such reports have it that the President turned down such cuts because they would have caused unemployment at certain shipyards. In the meantime, labor shortages in shipyards continue to be reported.

Spotting the Air News

Civilian Planes Loom

The way is open for aircraft manufacturers to start producing planes for the airlines and for non-scheduled civilian use as soon as hostilities cease in Europe. "Any plant and any materials" not needed for war work shall become available at that time, according to WPB's recent cutback order. Several airplane plants, which are located in easy manpower regions, have been ready for this order for some time. Builders of transport types will commence production on up-to-date military designs easily convertible to commercial use—namely the Douglas four-engined C-54, the four-engined Lockheed Constellation C-69, and the Curtiss-Wright Commando C-46. In the light plane field, and in small transports, most producers will begin with their most efficient pre-war models, a few on postwar designs which they have found time to engineer into the air.

Douglas Sales Strong

Douglas Aircraft seems to have tied up a major portion of immediate postwar airline requirements by contracting for delivery of $50,000,000 worth of C-54's (DC-4) and DC-6's to American Airlines, United Air Lines, and Pan American-Grace. Additional sales of the same types to Eastern Air Lines and other domestic and foreign operators are under negotiation.. Total of 108 of the two four-engined, 44- and 55-passenger liners, which have 25 percent more speed and ranges up to 3,000 miles, are already signed for. The Douglas civilian plane backlog is now up to about $100,000,000.

Douglas seems on its way to repeat history of the latter 1930's, when domestic airlines and some foreign lines standardized on the well-known DC-3, now the Army's favorite workhorse. Standardization throughout the airline system cuts operators' purchase and maintenance costs. The airlines do not admit planned standardization, and it may not happen. Their argument would be that the DC-4 has proved itself unexcelled in military air transport commands. Curtiss-Wright, Lockheed, Martin, Boeing and others, disappointed, still hope to break into transport on a large scale. But Douglas commitments already are equivalent to 60 percent of the airlines' present carrying capacity.

Post-Nazi Output One-Half

Aircraft production cutback when Germany folds up is estimated at 40 or 50 percent—from the present level of 8,000 units per month to 4,000 or 5,000 per month. Some types will be discontinued entirely. Certainly the long-range transports, long-range fighters, the B-29's, and perhaps some special types, will be continued to fight the Japs. Incidentally, Japan has surprisingly developed some first class planes, with high horsepower, which will give the Allies trouble when the showdown battle comes. But the power to be transferred from Europe to the East, plus that of the Russians who, nearly everybody now agrees, are determined to jump the Japs, should make the fight shorter than expected.

Speed Jet Development

Combination jet power and gas turbine development is being pushed with enthusiasm and high expectations in several government and private laboratories. The list of jet-turbine advantages over cycle engines, if engineers hopes can be realized, is most impressive. These include: less weight per horsepower; no friction parts except bearings; smooth torque on the shaft (in types using propellers); higher thermal efficiency; greater power per unit; much less cost per horsepower; cheaper, safer fuels. So rapid is design progress that the Bell P-59 Airacomet has already dropped back into the trainer category.

Surplus Disposition Studied

Recognizing that one of the toughest of the termination problems for aircraft manufacturers will be disposition of surplus materials and tools, Aircraft War Production Council has appointed a committee to study the question for member companies. Many of these companies either now have, or face the possibility of having large surpluses; successful disposition may be a make or break matter.

PATCH PLATE SPEEDS REPAIRS

LONDON—Minor battle damage to combat aircraft can now be repaired almost instantaneously by means of a new device announced recently by Colonel J. T. Morris, maintenance chief, Air Service Command in Britain.

The device is a patch made of thin steel, which can be fastened immediately, by means of a screw, over bullet holes and small flak holes. Previously such damage was repaired by riveting small steel plates over the holes, taking considerable time.

Army Releases Standard General Purpose Machine Tools to Users

DETROIT: Release of 25,000 to 30,000 standard general purpose tools, owned by Army Ordnance, may relieve the tight machine tool situation in the automotive plants here, plotting out its reconversion curve. The move, long sought by the regional War Production Board, finally won the approval of the Army Service Forces last week with the promulgation of a general order which was held almost as a military secret by Detroit Ordnance. Copies of requests to purchase were only available through Col. L. E. Ash, in charge of the tooling section of the Detroit Ordnance District.

The permission to purchase was applicable to contractors-in-possession, whether prime or sub-contractors. The pricing was in conformance with the Clayton pricing formula. Ownership would be transferred as of the date of purchase, but with the one string attached that the machine was to be kept in operation on the war production line until the contract on which it was being used was completed or terminated. It could then be removed from the war production line to whatever use the contractor wished to put it. If the contract was renewed or extended, the machine must be kept on the line.

While hailed as a big help to the automotive companies, now planning desperately for quick changeover, at least partially to civilian automobile production, it was not generally hailed as the solution to the machine tool problem. First, it was expected to fill not more than 50 to 60 per cent of the needs, although if it reaches this figure, it will be a substantial help. But the main objection voiced by the companies is that under dual operations, as expected in view of the fact that the Japanese war will still be going on when they reconvert and war production will still be carried on in many plants alongside of civilian work, a vital machine will still be kept on the war production line.

In other words, the manufacturers cannot figure too closely on filling up their production lines with these tools. If the services could give them sufficient advance notice on what their requirements will be to defeat Japan,

this might be done.

But Robert Grindley, head of the WPB's tooling section here, was optimistic over the action on the part of Ordnance. He hailed it as a pattern which other branches of the services could very well follow with great savings to the taxpayers and substantial help to manufacturers.

The Defense Plant Corporation alone holds 50,000 machine tools in Michigan. It has another 67,000 in Ohio, Indiana and Illinois which, if it adopted Ordnance's lead, it could turn to manufacturers. Grindley stated that if this was done, there would be sufficient general purpose tools to go around to every manufacturer who desired some.

Army Air Forces hold perhaps the largest number of tools. But there is no indication that it is ready to turn them loose to any extent. No one will make the first move to declare them surplus, the first pre-requisite to selling them to private firms.

While the prime contractors know of Ordnance's move, the sub-contractors are still not well apprised. Ordnance has promised to let them in and a scramble may result.

Meantime, up to September 1, the automotive companies have cleared requests with WPB regional office here for about 5,000 machine tools, totalling more than $28,000,000 in value. Their main complaint is that nowhere have they been promised definite delivery dates. General Motors still has more to clear, some of their divisions still making up lists. But Ford and Chrysler are said to have their lists through.

There is a feeling, however, that the larger manufacturers are not worrying too much over their immediate needs for partial reconversion. As an astute observer remarked:

"When the time comes, they know their suppliers will put their orders first. The little fellows are the ones that are worrying."

U. S. Postwar Plans Worry British Industrialists

LONDON—Private business, trade associations, the Press, and individual industrialists and economists here in Britain have been concerned for some months regarding the lack of a definite government plan for converting British industry to the production of civilian goods. In this country, where every factory and every worker is under a rigid governmental control there is little opportunity for private industry to consider postwar production plans on its own initiative. This concern is emphasized by the knowledge that American industry is now preparing for an obvious world-wide demand for replacement goods as soon as the war is over. British industry believes that it should be following this example since, as one man expressed it: "Our need for exports is greater than that of the United States."

It is believed here that every large American factory has its postwar planning department and is busy designing and tooling up for peace-time models. In Britain, no designer is allowed to work on postwar goods. Not one worker is permitted to be employed in the export trade. It is believed here that American industry will have the benefit of special government credits to convert from war to peace production. On the other hand, it is reported that the British government tells its industrialists that it is their responsibility to recover lost export markets. This appears to be an impossible situation since they are bound hand and foot by government control. Business men realize that it will be a difficult task to catch up with America's flying start, and one industrial correspondent has stated here that "It is not too much to say that the present situation is leading to something like panic in the export trade."

Report Truck Bookings

CHICAGO—Domestic bookings of electric industrial trucks and tractors during the month of June, 1944, totalled 381 units, according to the Industrial Truck Statistical Association.

Names in the News

K. T. Sorenson

Kreston T. Sorenson, who joined **William Sellers & Co., Philadelphia, Pa.,** less than a year ago, has been made vice president in charge of production. Mr. Sorenson has recently been in charge of design of special secret ordnance weapons and material for the Ordnance Department. Until 1941 he was associated with the Baldwin Locomotive Works in charge of heavy tank design.

Roy T. Hurley has been elected vice president of the Bendix Aviation Corp. Mr. Hurley is in charge of reconversion and immediate postwar planning. For the last year and a half he has served as production advisor for Maj. Gen. L. H. Campbell, Jr., chief of ordnance.

John J. Couch, former vice president of G. S. Rogers & Co., has been elected president of the company to succeed the late George S. Rogers. **E. L. Milford** was appointed to succeed Mr. Couch.

F. Jerome Tone, Jr., has been appointed vice president in charge of sales of the Carborundum Co., Niagara Falls, N. Y., to succeed **Charles Knupfer** who has been assigned to special sales and executive activities. **Harry P. Kirchner** has been named vice president in charge of production.

R. C. Nicholson has been appointed president and general manager of the Master Rule Manufacturing Co., New York, and **N. G. Anderson, Jr.** has been appointed vice president and works manager of the company. Mr. Nicholson has been with Master Rule since 1926 in various capacities and Mr. Anderson was previously with SKF Industries.

C. H. DeLamater, who has been associated with the Aluminum Co. of America for the past 16 years, has been named works manager of the Fairfield and Bridgeport, Conn., plants of the firm. He will succeed **Alvin H. Hinton,** who has been acting-works manager since the death of **Harry J. Deutsch.**

D. Wheeler Clark has been elected vice president of the E. W. Carpenter Manufacturing Co., Bridgeport, Conn., and assistant to the general manager. For a number of months, Mr. Clark has had charge of the operations of the metal working plant of the firm.

Fred O. Kolberg, formerly of the Crosley Corp., has been named works manager of the Warren City Manufacturing Co., Warren, Ohio.

Wilbur C. Osha, until recently general welding superintendent at a.c.f. Berwick, Pa., plant, has been appointed general supervisor of welding for American Car and Foundry Co. with headquarters in Berwick.

Harold C. Olson has been named sales manager of the Torrington Co., Bantam Bearings Div., South Bend, Ind. He was formerly assistant sales manager.

E. C. Carmany has been appointed vice president in charge of eastern operations of the company, with headquarters at the Wyckoff Steel Company's Empire Works in Newark, N. J.

John N. Booth, former general superintendent of the B.&S. Screw Products of Cleveland, Ohio, has been appointed general manager of the firm. Mr. Booth was previously connected with the National Carbon Co. and the Upson Nut Div. of Republic Steel Corp.

BUSINESS ITEMS

The Globe Products Manufacturing Co., 3380 Robertson Blvd., Los Angeles, Calif., have just purchased the entire machine tool line of the **Utility Tool and Die Manufacturers.**

Garrett Supply Co., 3844 South Santa Fe, Los Angeles 11, Calif., has been appointed **Carboloy Co., Inc.,** distributor for the Southern California-Arizona district.

Lempco Products Inc., Bedford, Ohio, have purchased the **Cleveland Pressed Steel Co.,** 2953 E. 55 St., Cleveland. The Cleveland company will operate under its own name, at the same location, and with the same officers.

The Optimus Equipment Co. has been organized at Matawan, N. J., to design and manufacture equipment for metal washing and to render engineering service. The company will operate in close affiliation with **Hanson-Van Winkle-Munning Co.,** Matawan.

Fairbanks Morse & Co. has purchased the **Pomona Pump Co.,** a division of the Joshua Hendy Iron Works, with plants in St. Louis and Pomona, Calif.

Product Designers has been organized by **W. C. Nichols** and **Joseph Palma, Jr.** at 230 No. Michigan Ave., Chicago, Ill., and offers service in idea development, design, engineering, tooling and packaging.

The Grayson Manufacturing Co. has changed its name to **Tung Tip Tools,** Div. of Lowell & Grayson.

OBITUARIES

Philip G. Johnson

Philip G. Johnson, president of the Boeing Airplane Co. and the Boeing Aircraft Co., died in Wichita, Kans., from a stroke. He was 50 years old. Mr. Johnson started at Boeing in 1917 and in 1926 he was elected president of the company having first served as draftsman, plant superintendent, production manager, superintendent and secretary, vice president and general manager.

Robert J. Wetzel, 52, manager of engineering and manufacturing at the Standard Tool Co., Cleveland, Ohio, passed away Sept. 12. Mr. Wetzel had been with Standard Tool for 36 years.

President **Albert L. Marsh,** Hoskins Mfg. Co., 67, died at his Detroit home, Sept. 17. He discovered an alloy making electrical heat-treating possible.

R. J. Wetzel

Harry Barney

Harry Barney, president of the Barney Machinery Co., Pittsburgh, Pa., passed away recently at the age of 65. Mr. Barney organized his own company in 1911, after starting in business with Manning, Maxwell & Moore Co.

Harry W. Avery, 88, former president of the Avery Stamping Co., Cleveland, Ohio, passed away Sept. 9. He was one of the first men in the metal industry to develop aluminum as a household commodity and some of the first aluminum cooking utensils on the market were designed and pressed at the Avery plant. From 1912 until his retirement 10 years ago Mr. Avery had been in business as an independent manufacturers' agent.

William A. Anderson, 74, died after a two months illness at his home in Princeton, N. J. Mr. Anderson has been president of John A. Roebling Sons Co. of Trenton since 1936.

George H. Charls, 66, president of the Metro Coal & Limestone, Inc., Canton, Ohio, died Sept. 11 at his home in Canton. Mr. Charls was one of the first men to perfect and use stainless steel. He was at one time vice president and director of the Stark Rolling Mill Co. and the Berger Manufacturing Co., Canton; president of the United Alloy Steel Corp. and the National Association of Flat Rolled Steel Manufacturers.

John Brouwer, superintendent of Gallmeyer & Livingston Co., Grand Rapids, Mich., died suddenly at his home Sept. 10 at the age of 60. Mr. Brouwer had been active in the machine tool industry for about 30 years.

George F. Morris, 81, former superintendent of the Ambridge, Pa., works of the American Bridge Co., died Sept. 11 in Leetomia, Ohio.

Raleigh H. Barnes, 46, assistant director of research of the American Steel & Wire Co., Cleveland, Ohio, passed away Sept. 2. Mr. Barnes had been with the company for almost 25 years and had held numerous positions in their Cleveland plant and office.

Henry W. Behrend, 72, machine manufacturers' agent, died Sept. 5. Mr. Behrend sold and installed machinery for the Cleveland Automatic Machine Co. for 40 years, 10 of them in Europe. Since 1938 he has been superintendent of Henry P. Boggis Co., Cleveland, manufacturers' agents.

MEETINGS

American Gear Manufacturers Association. Semi-annual meeting. Edgewater Beach Hotel. Chicago, Ill. Oct. 30-Nov. 1.

American Machine Tool Distributors' Association. Fall meeting. The Homestead. Hot Springs, Va. Nov. 13-14.

American Society of Mechanical Engineers. Annual meeting. Pennsylvania Hotel. New York, N. Y. Nov. 27-Dec. 1.

American Society for Metals. Annual meeting. Hotel Statler. Cleveland, Ohio. Oct. 16-20.

American Society of Tool Engineers. Semi-annual meeting. Hotel Syracuse. Syracuse, N. Y. Oct. 12-14.

American Welding Society. Annual meeting. Hotel Cleveland. Cleveland, Ohio. Oct. 16-19.

Association of Electronic Parts and Equipment Manufacturers. Electronic Parts and Equipment Industry Conference. Stevens Hotel. Chicago, Ill. Oct. 19-21.

National Electronic Conference. Medinah Club of Chicago. Chicago, Ill. Oct. 5-7.

National Metal Congress. National Metal Exposition. Public Auditorium. Cleveland, Ohio. Oct 16-20.

National Safety Council. National Safety Congress. Sherman & LaSalle Hotels. Chicago, Ill. Oct. 3-5.

Society of Automotive Engineers. National Aircraft Engineering and Production Meeting. Hotel Biltmore. Los Angeles, Calif. Oct. 5-7.

Society of the Plastic Industry. Fall meeting. Waldorf-Astoria Hotel. New York. Nov. 13-14.

Shop Equipment News

Worm Feed on Chrysler Injection Molding Machine Gives Greater Pressure, Permits Thick Sections

A continuous injection molding machine that handles plastics or rubbers has been developed by the Chrysler Corporation, Detroit, Mich. Licensing arrangements have already been arranged by the corporation with other manufacturers.

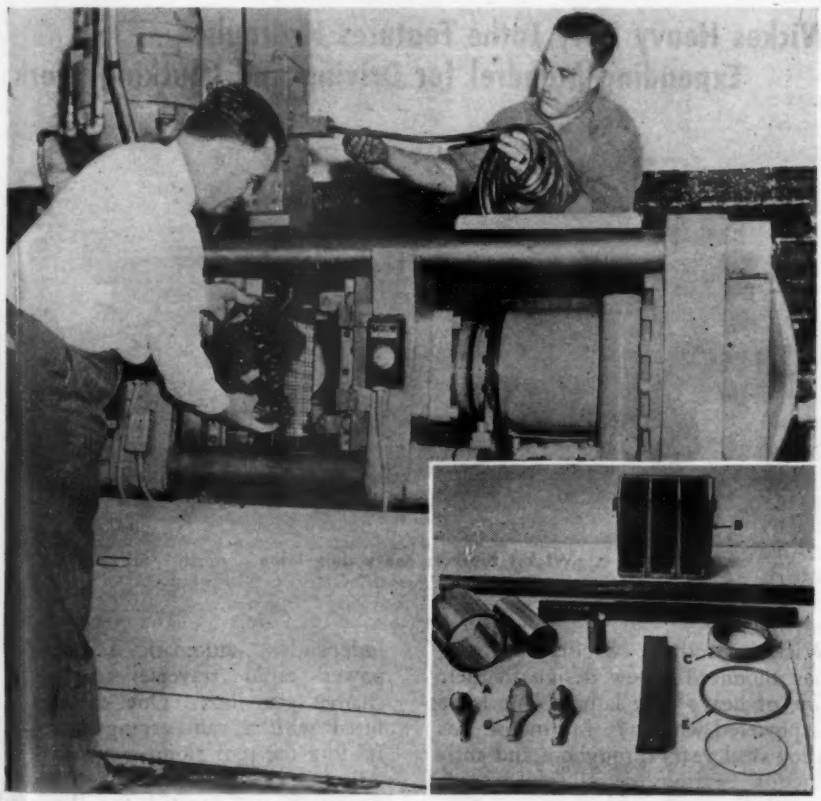
The machine will produce an item as large as a battery case (8 lb. of thermo-setting plastic) in less than 5 min., or can be used to extrude rubber or plastic tubing on a continuous basis. Plastic materials are hopper fed in standard granular form; rubber stocks with a cross-section of ¼ × ½ in. are consumed on a continuous basis.

As the material is fed into the machine, a vertical worm draws it down past "pressure-retaining" baffle plates, which exert a pressure of 25,000 lb. per sq. in. on the substance. The plates serve the additional purposes of preventing any backing up of rubber or plastic and of maintaining a continuous flow into the mold or through the extrusion die. In the case of a molding operation, the machine runs until the mold is filled. At this point, the screw automatically reverses a half turn and stops. When this happens the baffle plates keep the material on the lower end of the worm from backing up past them. At the same time, friction and electric heat keep the material in plastic form but cool enough so that it does not cure. A churning apparatus keeps material in the heating cylinder thoroughly mixed.

It is stated that because of uniform feed and even mixture of materials, the curing time has been cut as much as 93 percent. The complete curing cycle for conventional synthetic rubber stocks ranges from 2 to 3 min., as compared to 15 to 20 min. normally. It is said that the physical properties of conventional stocks, when molded in the Chrysler machine, are slightly better than when compression molded.

Parts have been made as thick as 2½ in. by 6 in. square. And these were cured in 4 min. Despite the weight of plastic or rubber molded per shot, the machine weighs only 6000 lb., and the die-clamping capacity exceeds 450 tons.

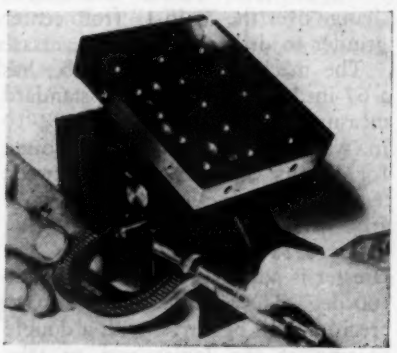
Electric heating is used with this machine. Equipment capable of producing curing temperatures between 300 and 400 F. and preheating temperatures of 180 to 220 F. have been found satisfactory.



Synthetic-rubber link bushings for shock absorbers, 144 pieces every 3 min., are produced by Monroe Auto Equipment Co., under machine license issued by Chrysler Corporation. Inset—typical products produced by Chrysler machine: *A*, experimental thermoplastic rocket tube with ¼ in. wall thickness; *B*, an 8-lb. battery case of paper-filled thermo-setting plastic; *C*, synthetic rubber seal for pipelines; *D*, thermoplastic carburetor bowl; *E*, synthetic-rubber "O" ring seal, 5 in. diameter by ¼ in. thick, for aircraft engines

Nichols-Morris Announces Bemisine Toolmaker's Aid

The Bemisine, a new time-saving device for setting or measuring any angle from 0 to 90 deg. to accuracy within one minute or arc, has been announced by Nichols-Morris Corp., 50 Church St., New York. This new



Bemisine toolmaker's accessory

tool requires only a 2 in. capacity micrometer and reference to the standard table of sines and cosines to determine and set any angle within its range in approximately a minute's time.

It is described as a multi-purpose tool room accessory, capable of holding small work pieces for grinding, machining and inspection operations. It is recommended especially for use when grinding and jig boring.

The work table is mounted pivotally so that it can be tilted to any angle up to 45 deg. Angles in excess of 45 deg. are secured by resting this fixture on the second side of its right-angular base and computing the complementary angle.

Standard gage blocks may be used with the Bemisine to determine angles.

Dalzen "2-in-1"

Dalzen Announces Combined Center Grinder, Drill Press

The Dalzen "2-in-1," a single machine which performs both center lapping and drill press operations, is announced by the Dalzen Tool & Manufacturing Co., 12255 East Eight Mile Road, Detroit 5, Mich. One simple adjustment, requiring only a few seconds, is all that is necessary to change over the "2-in-1" from center grinder to drill press or vice versa.

The machine weighs 165 lb., has a 67 in. height and its floor standard measures 15 × 21 in. The 10 × 10 in. work table is smooth and slotted for T-bolts. Standard length between centers is 39 in. The capacity of a drill press, which will drill to the center of a 13 in. circle, is ½ in. Dresser is adjustable from 20 deg. to 100 deg. The spindle rotates on two precision ball bearings, with a double bearing at the lower end to take thrust.

Air-Hydraulics Vise With Interchangeable Jaw Plates

Air Hydraulics Division, Beyer Machine Company, Jackson, Mich., has announced a hydraulic vise with moving jaw mounted on V ways to attain precision alignment. It has interchangeable jaw plates which are easily removed for attaching special plates. A divided jaw permits its power to be used for punching, broaching, removing pulleys, gears, etc., from long shafts.

Specifications include: over-all length, 26 in.; over-all height, 8 in.; depth of throat, 4 in.; maximum width of opening, 8 in.; jaw plates, ¾ in. × 1½ in. × 5 in. The hydra-operator unit: length, 14¼ in.; width, 10¾ in., height, 8 in.; fluid capacity, 8 CW in.; jaw pressure capacity, max., 10,000 lb.; weight, 65 lb.

Atlas Weld Cleaner Combines Bristles and Slag Remover

Atlas Welding Accesories Co., 14824 Wyoming Ave., Detroit 21, Mich., has made improvements on its Model A Dual-Tool for weld cleaning. The

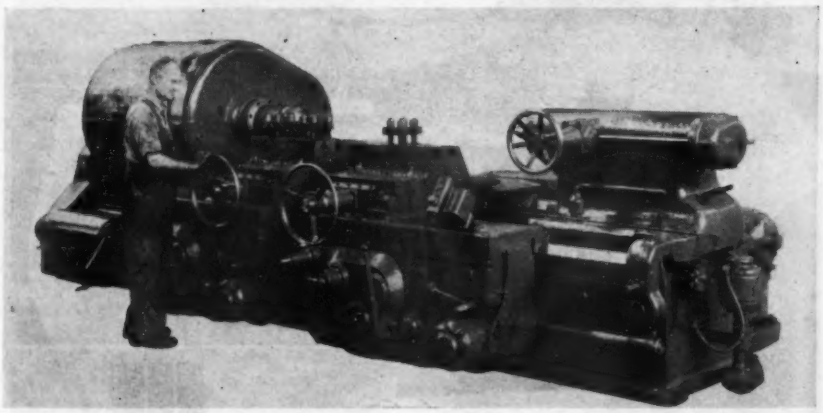
Atlas weld cleaning tool

improved model combines wire bristle brush and slag removing head in one unit.

The tool features an improved brush holder which permits removal of brush for reversing or replacement by inserting screwdriver at rear end of holder.

Flex-O type spring steel handgrip permanently welded to the handle eliminates the possibility of loosening or breakage. The chipping head is of hand-forged tool steel. Every part of this tool is replaceable, including cone and chisel heads.

Wickes Heavy Duty Lathe Features Hydraulic Expanding Mandrel for Driving and Chucking Work



Wickes Brothers heavy duty lathe

Wickes Brothers, Saginaw, Mich., has anounced a new design in their line of heavy duty lathes. The lathe is powered with a 75 hp. motor, has alloy steel gears throughout and antifriction bearings on all rapid turning shafts.

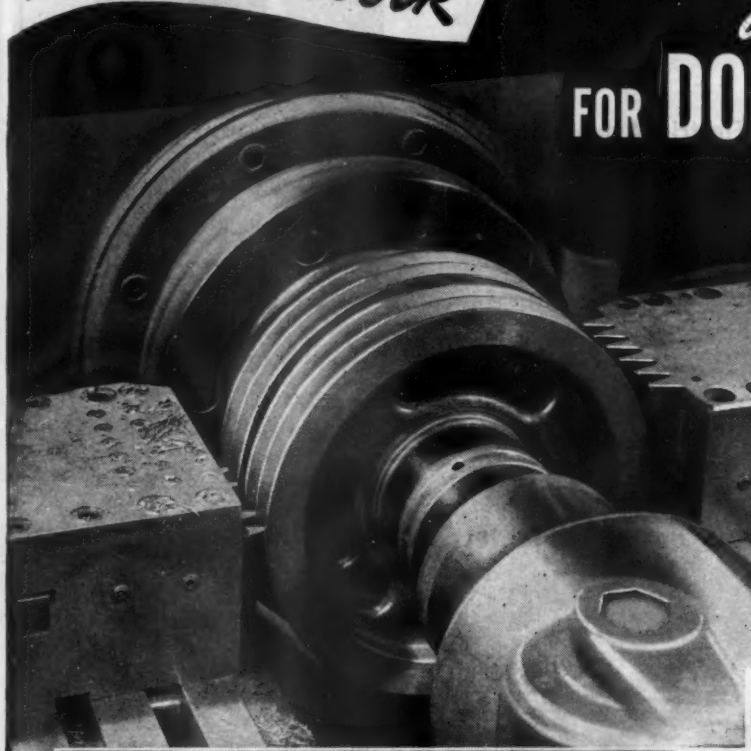
It has a hydraulic expanding mandrel for driving the work which is chucked on the mandrel and on a dead center in the tailstock. Two heavy duty carriages and aprons have independent automatic feeds with power rapid traverse and quick change gear box. One carriage is fitted with a cam arrangement for feeding the tool along a curved line. All controls are designed for easy operation and located for the convenience of the operator.

The machine requires a floor area of approximately 160 sq. ft. and weighs approximately 52,000 lb. with electrical equipment.

LODGE & SHIPLEY LATHES *at work*

Cutting 5 V-GROOVES IN V-BELT SHEAVES *at one time!*

FOR DODGE Manufacturing Corporation



Lodge & Shipley Duomatic Lathes in the light duty sheave department of the Dodge Manufacturing Corporation, Mishawaka, Ind.

In producing the famed Dodge "D-V" Sheaves, nothing is more important than *accurate and uniform grooving.* This permits V-Belt sidewalls to last longer because each belt fits properly in its groove, providing all belts with equal pull.

With Lodge & Shipley's Duomatic Lathes, these V-Grooves are not only machined with the required degree of uniform accuracy, but five grooves are cut at once, effecting considerable savings in production time.

This greater efficiency in the use of multiple tools is just one of the many features that makes the Duomatic outstanding among automatic lathes. For example, the dual carriages and tool slides, front and rear, permit any combination of turning and straight and angular facing operations. Movements and set-ups are entirely mechanical; no cams are required to change cycles. For more complete information call on Lodge & Shipley Engineers or write on your company letterhead for Bulletin No. 601.

THE LODGE & SHIPLEY MACHINE TOOL CO.

CINCINNATI 25, OHIO, U. S. A.

ENGINE—TOOL ROOM—AUTOMATIC—OIL COUNTRY LATHES

L & S LATHES

Air Reduction welding control panel

Air Reduction Tack Welding Circuit Control Panel Ready

Air Reduction, 60 E. 42 St., New York 17, N. Y., has placed on the market a new and improved circuit control panel for tack welding with a constant potential power supply.

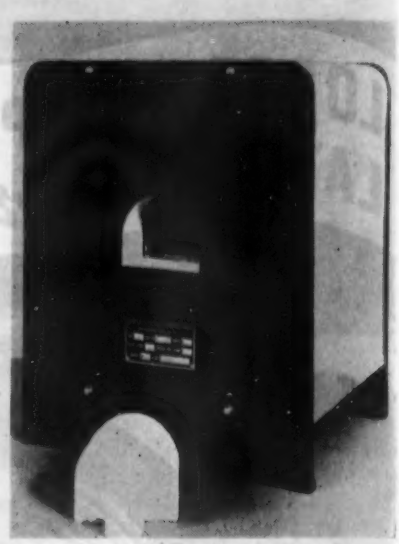
Known as the "Wilson Type 30 Special Tack Welding Circuit Control Panel," it is described as of simple design, sturdily constructed and very compact.

Panels are available in 150 and 230 amp. sizes. The former has taps for 10, 20, 40 and 80 amp., the latter for 10, 20, 40, 80 and 80 amp. Current adjustment on each unit is possible in 10 amp. steps.

Harper Electric Announces New High Temperature Furnace Line

A complete line of high temperature laboratory furnaces with maximum temperatures of 2,750 F. and operating temperatures of 2,500 F., is announced by the Harper Electric Furnace Corporation, Niagara Falls, N. Y.

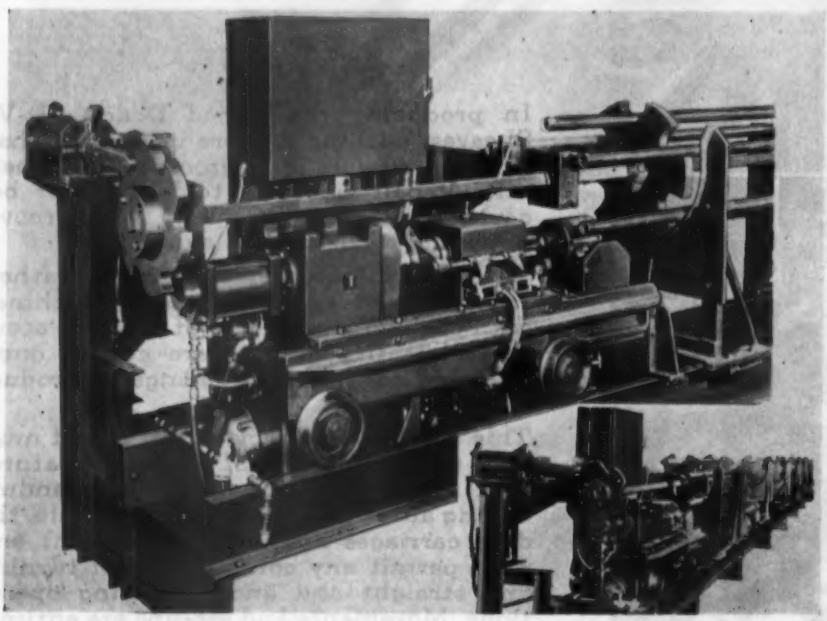
These furnaces are built for industrial and school laboratory uses where materials are to be heated in an oxidizing atmosphere at temperatures above those attainable with metallic elements.



Harper laboratory furnace

These high temperature laboratory furnaces are equipped with a silicon carbide muffle and are heated with Globar brand non-metallic heating elements located above and below the muffle to assure uniform distribution of heat. Either a plug type or a counter-balanced door is available. Furnaces are made in various sizes with chamber dimensions of 2⅜ in. high × 3½ in. wide × 5 in. deep, and 5½ in. high × 6 in. wide × 18 in. deep. They are available for bench mounting or with legs for floor mounting.

Pines Engineering Company's Automatic Reaming and Burring Machine Takes Tubes to Six Inches Diameter



Pines automatic reaming and burring machine

A new combination automatic reaming and burring profiler for handling tubes up to 6 in. O.D. and lengths from 3 ft. to 60 ft. or longer is announced by Pines Engineering Co., Aurora, Ill.

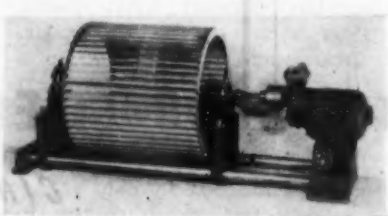
The head assemblies which consist of the spindles and chucks are mounted on heavy cars suspended on flanged wheels anchored to the channel iron track. One car can be moved to position for processing any length of tube desired. Tubes are fed to and from profiler by means of automatic reel feeding mechanism which selects tubes from storage rails regardless of diameter. The indexing mechanism, automatic self-centering type chucks, and the spindle advances are all actuated by hydraulic cylinders.

The control panel houses the relays, motor starters and other electrical accessories for automatic cycle operation. Up to 400 tubes per hour can be faced and burred.

Globe Introduces Dynamic Balancer for Small Shops

The Globe Service Dynamic Balancer has been developed by the Globe Tool & Engineering Co., 436 Davis Ave., Dayton 3, Ohio, for repair shops and maintenance organizations.

It is described as capable of accommodating weights up to 300 lb. and sizes up to 20 in. dia. Parts can be balanced until their remaining vibration is less than 0.002 in.



Globe Service dynamic balancer

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company

MOLY

500 Fifth Avenue · New York City

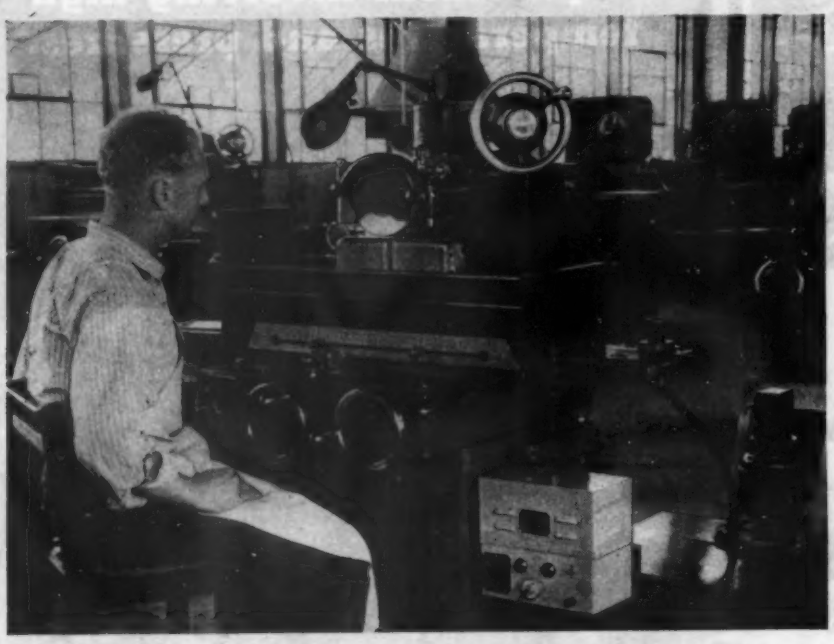
Continental Machines Produces Surface Grinder With One Hydraulic Unit Controlling Five Operations

The new model G-1 DoAll surface grinder, manufactured by Continental Machines, Inc., 1301 Washington Ave. South, Minneapolis 4, Minn., is described as capable of prducing a fine finish to within six micro inches when working with standard grit wheels. It has a table travel of 21 in. and transverse travel of 7½ in. with a vertical wheel head adjustment of 12 in., using a 7 in. × ½ in. × 1¼ in. wheel.

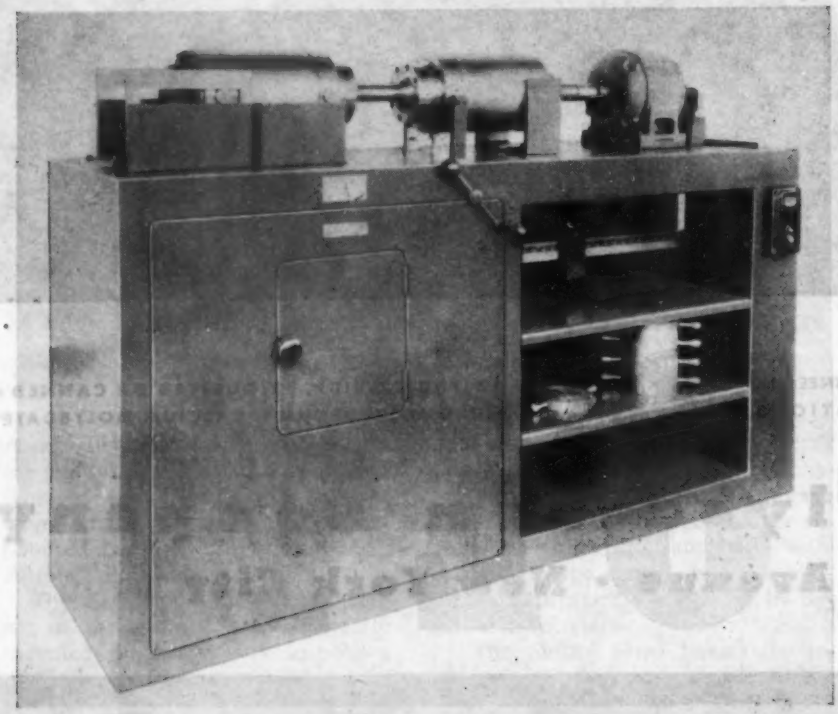
The machine weighs 2,200 lb. This more-than-normal weight is said to be used to attain greater rigidity and to absorb vibration. Total hand-scraped way area is 386 sq. in. The working area is completely supported, eliminating any "overhanging," to assure parallelism and flatness over the entire work area.

One unit controls the five hydraulically actuated movements of the machine, and elimnates much of the piping of separate units. When the surface grinder is under automatic operation, the cross feed screw disengages automatically.

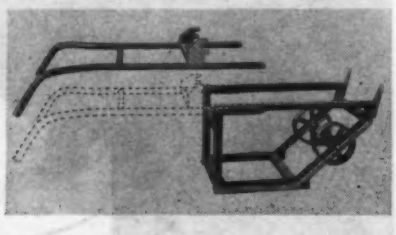
Standard equipment is the direct motor driven, precision ball bearing spindle. The grinder spindle head is built especially for this spindle and is lapped for a precision fit. The wheel head is lowered or raised by means of a graduated hand wheel operating the vertical adjustment screw through a single gear contract for positive movement.



Continental DoAll surface grinder



Baldwin rotating beam fatigue machine



Palmer-Shile truck and drain rack

Palmer-Shile Makes Detachable Handled Truck and Drain Rack

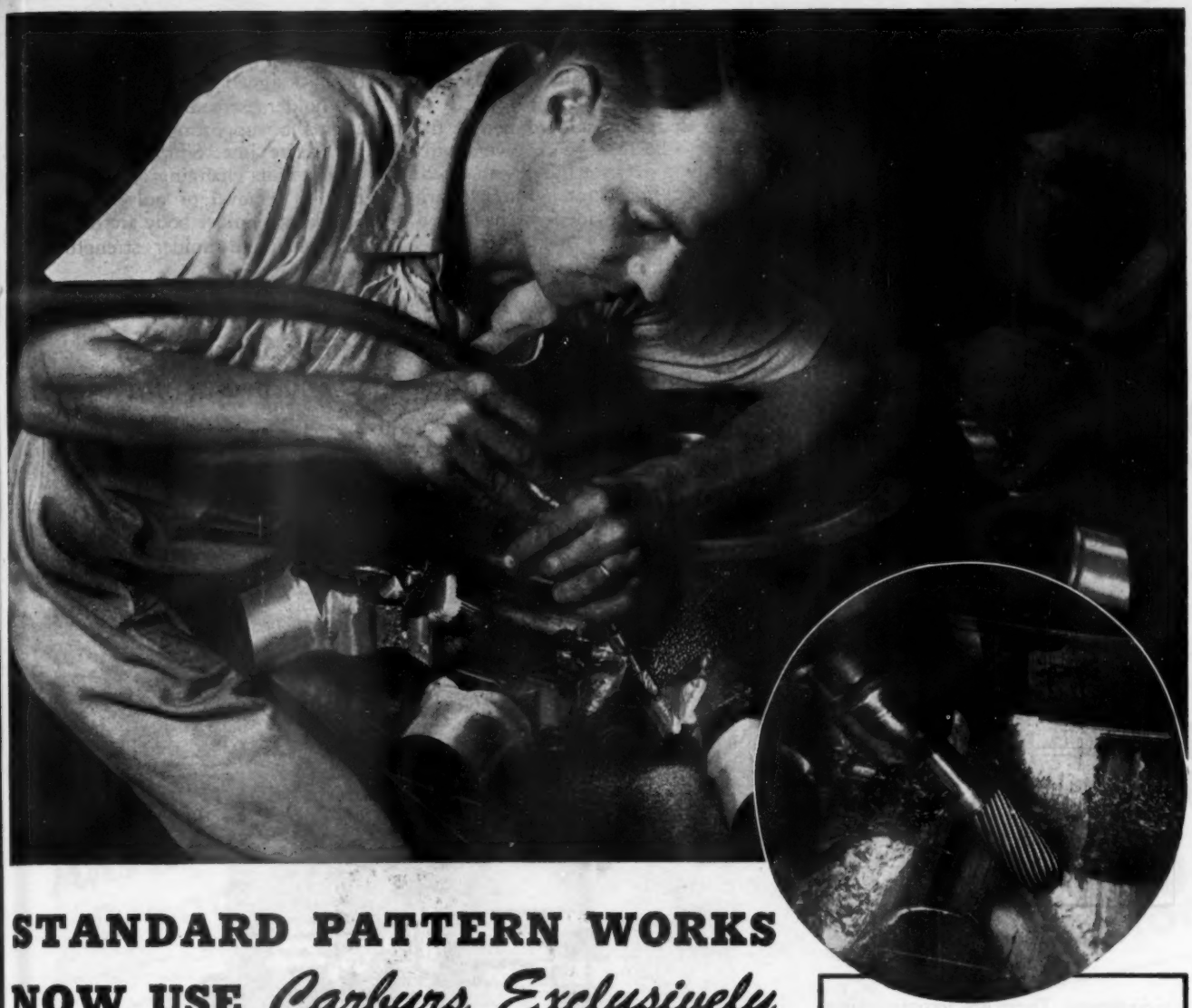
Palmer-Shile Co., 780 South Harrington Ave., Detroit 17, is manufacturing combined truck and drain rack, with detachable handles which can be made to serve any number of units. When truck is in use as a drain rack, or as a temporary storage rack for a drum, the handles are simply pulled out. This is said to effect both floor space economies and savings in costs.

Baldwin Produces Oversize Rotating Beam Fatigue Machine

The Baldwin Locomotive Works, Philadelphia, is producing a new oversize rotating beam fatigue machine, model SF-10 R.

The machine has a testing capacity from 0 to 10,000 inch-pounds, adjustable by units of five-inch-pounds (bending moment) by position of weight on beam. Specimen length is adjustable from three and one-half to nine and one-half inches.

The design of the machine is based on published reports of studies which indicate that specimens of one inch minimum diameter eliminate "size effect" in fatigue.



STANDARD PATTERN WORKS NOW USE *Carburs Exclusively*

Carburs are the ideal rotary files for pattern shop work . . . as now evidenced by their use at Standard Pattern Works—one of the leading concerns of this type in the Detroit area. Says Mr. E. J. Swink, president of Standard Pattern, "We find that Carburs are excellent tools for our type of work. Those that we have had in use since our first order was placed months ago still show little or no evidence of wear. We have been able to greatly reduce burring and cutting time on aluminum and brass because these tools can be run faster and there is little clogging of chips in the teeth to reduce cutting efficiency. We are now using them exclusively on all operations where a rotary file can be used."

Carburs—industry's first cemented-carbide rotary files—are now available in twelve standard shapes, each in from four to six different sizes and from fine to coarse cut. Special shapes and sizes can also be produced to meet specific needs. A new booklet contains complete information. Write for your copy today.

A FULL YEAR'S USE WITH THIS ONE CARBUR

A year ago, Standard Pattern Works secured one Carbur for trial purposes. It was turned over to one man in the shop who found continuous use for it. It was on the strength of his enthusiasm for this tool that more Carburs were purchased. Recently even with other Carburs on hand, it was with reluctance that he parted with his original tool so that it could be resharpened (at a Lincoln Park man's suggestion) at the factory. As far as he was concerned, it still was doing a good cutting job.

ARMY E NAVY

LINCOLN PARK INDUSTRIES, INC.

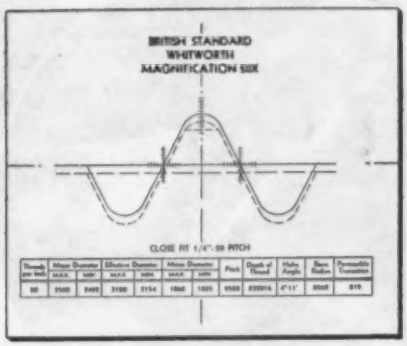
Successor to The Lincoln Park Tool and Gage Company and Carbur, Inc.

1721 FERRIS AVENUE • LINCOLN PARK 25, MICHIGAN

Engineers Specialties Ready With Transparency Charts

Engineers Specialties Division of The Universal Engraving & Colorplate Company, 980 Ellicott St., Buffalo 8, N. Y., is prepared to supply British Standard Whitworth thread, engineers'-transparency (glass) charts for optical projectors and comparators. There are two distinct sets: one set for close fit and another for medium fit. They are composed of twenty-one charts each and cover pitches from 40 to 3.5 inclusive. Sizes of charts and magnifications match the popular American national form screw-thread comparator charts produced by the same company.

The charts are available either as complete sets or in selections of individual ones. There are accommodated by the chart holding fixtures and adapters and the filing cabinets regularly supplied.



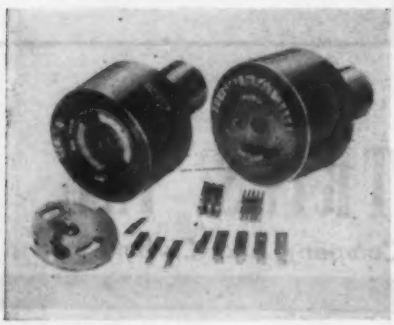
Engineers transparency charts

Acromark Stamping Type Holder is Easily Changeable

A new combination stamping type holder which makes possible the arrangement of segment type in one or more lines, or allows lines to be complete circles or portions of circles spaced as desired, has been developed by Acromark Company, 7-13 Morrell St., Elizabeth 4, N. J.

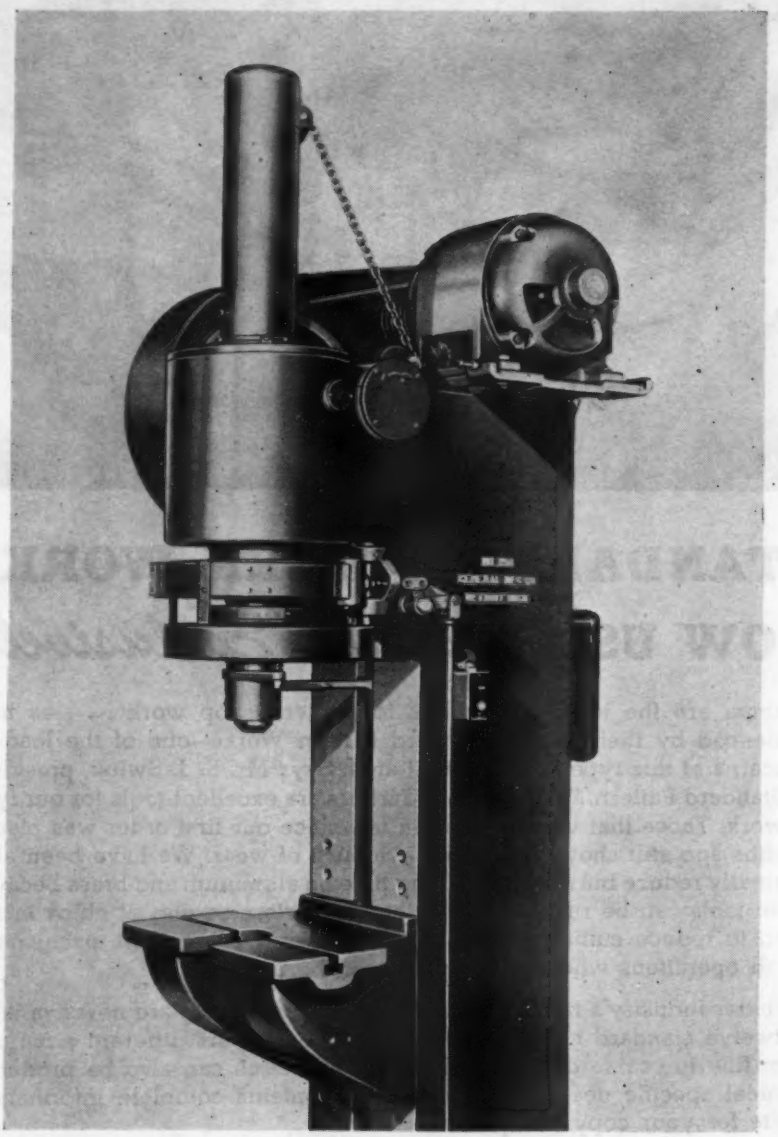
The design is said to permit the holder to be made with several different type sizes, each easily changed. Holders designed for use in standard die-sets are provided with tapped mounting holes.

Acromark heavy duty segment style type, designed in conjunction with the holder, is readily changeable and attains a supporting fit throughout the entire line. Simplified construction permits changing of type in any line by removal of only one screw. Shank and holder body are one piece for maximum holder strength and accuracy.



Acromark stamping type holder

General Straightening Press Features Simplicity of Design and Operation; Has Ball Bearing Drive Shaft



General model 256 straightening press

General Manufacturing Company, Detroit, has announced a new streamlined type press—model 256—for straightening, bending, forcing and push broaching. A solid column replaces the three posts; the drive shaft is mounted on ball bearings and an auxiliary return brake has been added which prevents mechanical shock when the ram returns rapidly after the power stroke.

The opening and table height can be changed by simply removing six screws and resetting the table in holes which are drilled in the column in 3 in. steps.

COLONIAL Broaching news

COLONIAL BROACH CO.
P. O. Box 37 Harper Station
Detroit 13, Mich.

Are you on the mailing list? Ask for it on your company letterhead

MULTIPLE SPLINE PROCESSING

BRAKE INSER
SLOTTED BY
BROACHING

Dual Lead
Angles Broa

Queries And
Answers On
Broaching

PRECISION
NUTS NOW
BROACHED

BROACHED
BLADES
FOR
NAVY
TURBINES

Broaching
Sprockets

DO'S AND
DONT'S ON
BROACHING

Broaching
Pump Rotors

BROACHING METHODS AND APPLICATIONS

Broaching Connecting Rods

Broaching Carburetors
Broaching Garand Rifles

Zero Backlash
Splines

Broaching Tractor
Links Increases
Accuracy In High
Production

Getting the Most
Out of Your
Broaches

BROACH RE-SHARPENING

Wizard gasket cutter

Miller-Knuth Wizard Variable Gasket Cutter

The Wizard gasket cutter, announced by Miller-Knuth Manufacturing Co., 412 South 18 St., Omaha 2, is described as ideal for cutting circular gaskets from sheet rubber, leather, paper, copper or lead. It is said to be quick to set over a wide range of sizes and produces a clean cut edge.

Two sizes are available. No. 1 has cutting range from 2 to 34 in.; No. 2 has cutting range from 2 to 58 in.

Florian Produces Sine Angle Plate for Checking Angles

The Florian Manufacturing Co., Plantsville, Conn., has perfected a new sine angle plate which it describes as simplifying the checking and grinding of accurate angles from 0 deg. to 90 deg., accurately to four millionths in one inch.

Florian sine angle plate

Using gage blocks and a table of sines, any angle may be set and the setting positively maintained by means of locking screws, operating through the split bearing.

The sine angle plate is a complete unit of plate and base, described as a high quality hardened and ground precision tool, built to withstand continued use in busy shops.

Studebaker Announces Corsair Hydraulic Gap Type Press for Inexperienced Workers

Studebaker "Corsair" hydraulic gap type press

Studebaker Machine Co., 1221 South 9 St., Maywood, Ill., announces a new air hydraulic, gap type, speed-press, the "Corsair," with maximum pressure of 1¾ ton. It is also made for 2½ ton maximum pressure.

Stroke may be set anywhere from 1/32 to 2½ in. and pressure may be pre-selected. The air cylinder and hydraulic pump units, built into the press body, are easily accessible and removable.

The speed of the ram can be preset, with a fast blow for tough materials and a squeezing action for fragile materials.

Sheffield Introduces New Type Snap Gage Spindle

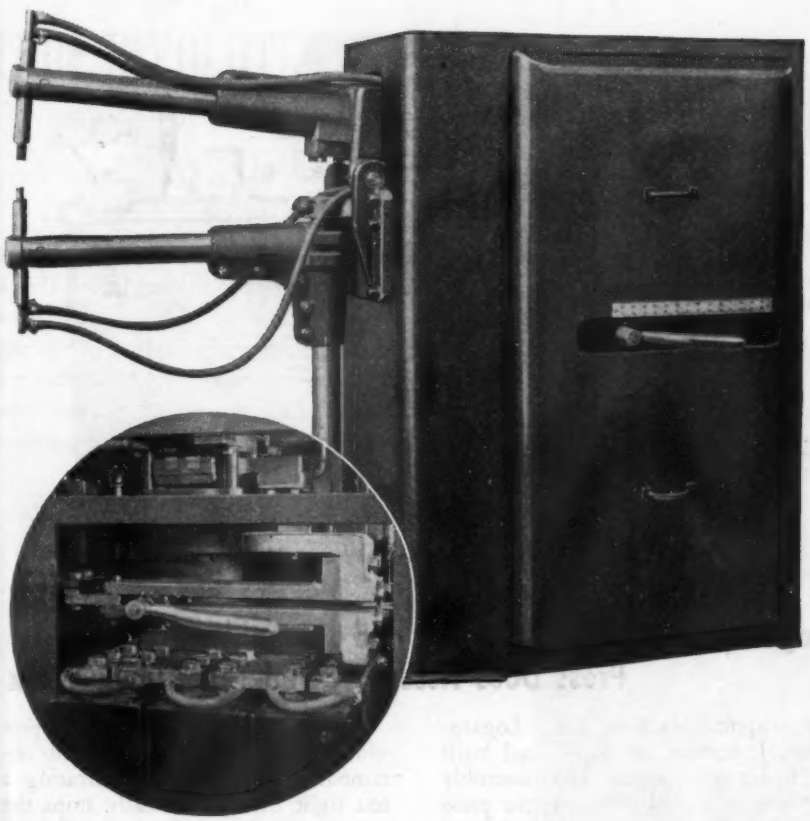
The introduction of a new type snap gage spindle for use with the Precisionaire instrument is announced by the Sheffield Corporation, Dayton, Ohio. It is stated this is the first time any manufacturer has offered an application combining the features of snap and air-flow gages.

It is said that this kind of spindle can be used on highly finished or soft plated parts without marring or scratching them, and on thin-walled cylinders without any danger of collapsing them. The two other principal uses are for checking work while in the machine and for checking parts of large size or unweildy shape which could not be presented to the gage.

Precisionaire snap gage spindle

BATTERY WELDERS Will Weld–

on the same machine with only a lamp cord for power supply



That kind of performance—while producing better and more consistent welds than formerly obtainable is now possible with the PROGRESSIVE line of battery-operated resistance welders: spot, seam, flash or butt.

Illustrated here is the "economy" model of the line. Note the compactness—with specially developed batteries and the exclusive PROGRESSIVE non-arcing contactor built into the base of the machine.

In addition, these Battery Welders, due to their simplicity of construction and operation, do not require highly trained engineers to maintain and service them.

If you do not know the story of one of the most important welding developments in years, ask for a copy of "How and Why of Battery Welding" (Bulletin #902).

PROGRESSIVE WELDER CO.

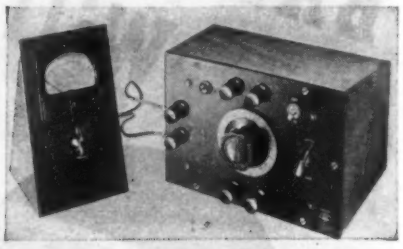
SEAM PROJECTION & BUTT • *Electric Welding Equipment* • PORTABLE GUN & PEDESTAL

3050 E. OUTER DRIVE • DETROIT 12, U. S. A.

Westinghouse high frequency generator

Industrial Instrument Direct Indicating Comparison Bridge

Speedy testing of resistors, capacitors or inductors in terms of ohmage, microfarads or henries, respectively, is the purpose of Type LB direct-



Industrial Comparison bridge

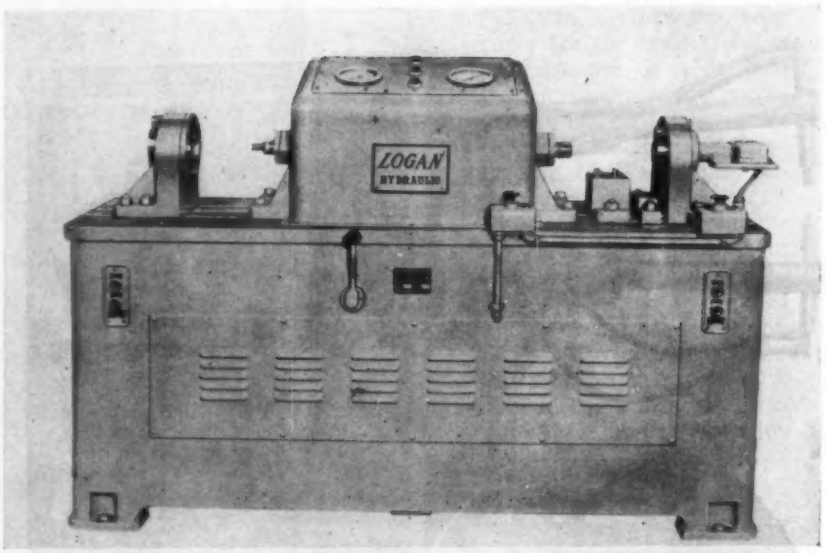
indicating comparison bridge just released by Industrial Instruments, Inc., 17 Pollock Ave., Jersey City, N. J.

Ranges are: Capacitance, between 0.0001 and 1.0 mfd.; resistance, between 2,000 ohms and 20 megohms; inductance, 5 and 50,000 henries.

Westinghouse Announces High Frequency Generator Line

For both induction and dielectric heating loads, a complete line of high frequency generators with ratings of 1, 2, 5, 10 and 20 kw in line with NEMA standards is announced by Westinghouse Electric and Manufacturing Company, Pittsburgh 30, Pa. Units of 50 to 200 kw capacity can be supplied.

Completely self-contained, the units require only electrical connection to a 60-cycle power supply and have no external cooling or other auxiliaries. Primary voltage is 220 or 440 v., single phase for ratings of 5 kw or lower and 3 phase for 10 kw and higher. Housed in the single cabinet are the oscillator, power supply, blower, and necessary switchgear. The high frequency section is completely shielded.



Logansport hydraulic gaging and assembly press

Alloy Rods Develops AC-DC Stainless Steel Electrode

The Alloy Rods Co., York, Pa., has developed a new stainless steel arc welding electrode, said to perform equally well on AC or DC in all positions.

These AC-DC electrodes are described as having exceptionally low spatter loss, easily removed slag and instant arc establishment.

Logansport Hydraulic Gaging and Assembly Press Does Assembly and Tear Down Work

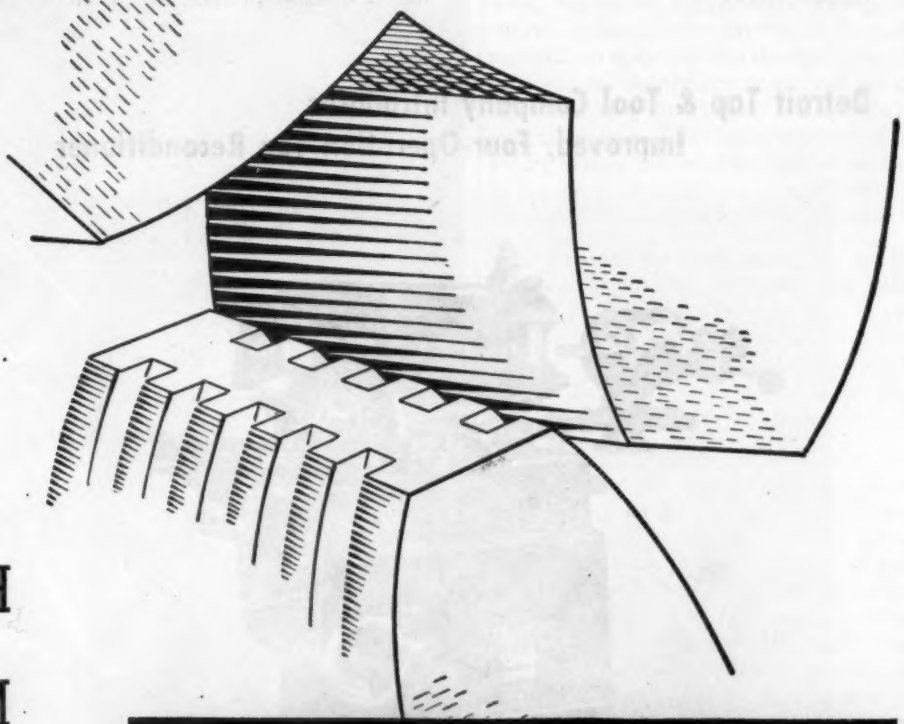
Logansport Machine Co., Logansport, Ind., has developed and built a hydraulic gaging and assembly press with a dual function: the press fit assembly of a splined shaft into a splined hole of a disk shaped part at certain predetermined but adjustable pressures, and the disassembly for tear down inspection after green run of the engine.

Three indicating lights are provided to show the type of fit obtained. The red light, indicating a too tight fit, automatically stops the pressing stroke of the hydraulic cylinder.

The press has two independent hydraulic systems, each consisting of a motor driven pump mounted on an oil reservoir, an adjustable pressure

Now: CURVE-SHAVING

Available exclusively on Michigan Rack and Rotary Gear Finishers



A Finishing Process which produces Gears with

END-RELIEVED TEETH

having

TRUE INVOLUTE FORM

over their entire length

With this process any desired amount of relief (to prevent end loading of teeth due to shaft deflection) can be quickly and accurately produced and re-produced automatically at one or both ends of the tooth without destroying correct involute form.

"CURVE-SHAVING"
True involute over entire length of tooth (same curved relief at tip, pitch-line and root)
LOAD AT CENTER OF TOOTH
BIAS BEARING LOADS ENDS
ORDINARY "CROWNING"
If involute is correct at center, it will be high at one end, low at the other.

ORIGINATORS of GEAR-SHAVING

MICHIGAN TOOL COMPANY

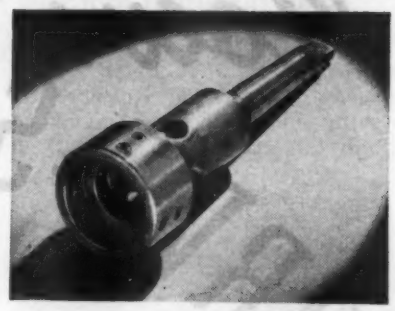
7171 E. McNICHOLS ROAD . . DETROIT 12, U. S. A.

control valve, an operating valve and a hydraulic cylinder.

Work holding fixtures with interchangeable locating bushing and collars for different work pieces are provided on each end of the machine as well as interchangeable work support blocks.

Rieger Manufacturing Co. Die Holder for Production Runs

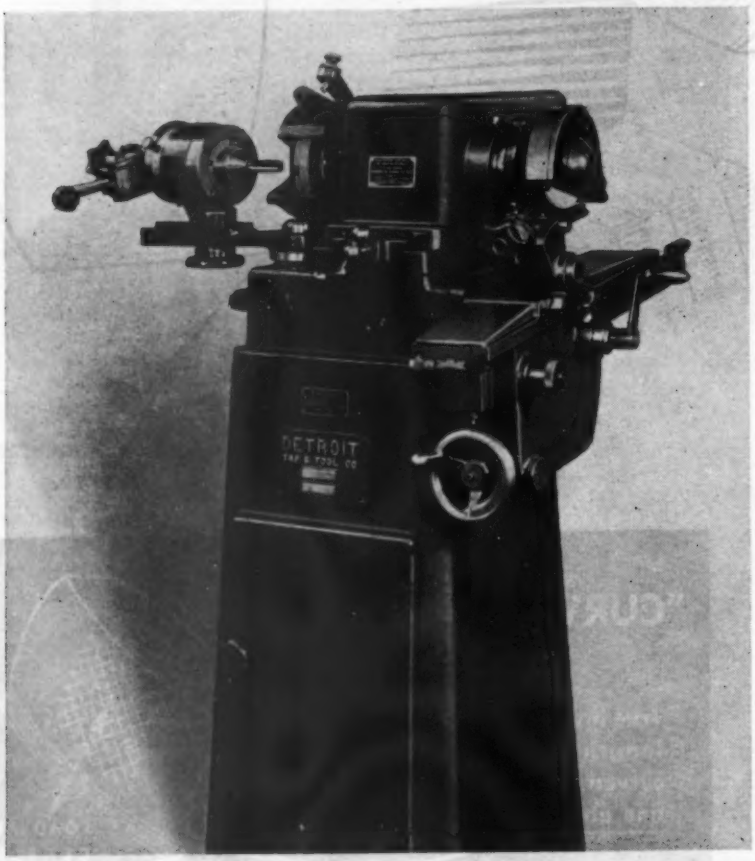
The Rieger Mfg. Co., Dept. AM-8, Miamisburg, Ohio, is producing a new die holder to accommodate either a 1 in. or 1½ in. O.D. button die. The standard model has a No. 2 Morse taper shank. Other taper and straight shanks are available on special order. Four large holes in the body of the tool provide for the free ejection of chips and shavings.



Rieger die holder

The manufacturer recommends the use of the die holder for production runs of thread chasing, up to ⅝ in. dia. and 3 in. length, on bench lathes, turret lathes, or drill presses having reversible spindle rotation. The tool is said to assure true, straight head.

Detroit Tap & Tool Company Introduces Improved, Four-Operation Tap Reconditioner



Detroit Tool tap reconditioner

An improved design of its tap reconditioner, Model DTR-3, on which all operations necessary for keeping taps in condition can be performed, has been made available by Detroit Tap & Tool Co., 8432 Butler St., Detroit 11.

This new tap reconditioner has been transformed into a "4-in-1" machine by the addition of facilities for grinding the full length of the tap flutes, to the machine's original functions of chamfering, spiral pointing and spiral point polishing. Taps with two to six flutes may be ground on one head.

Feature is a new chamfering head employing "quick change" type collet chucks for standard tap shank sizes. The tap unit and the unit for flute grinding and spiral pointing accommodate collets from the smallest machine screw up to 1¼ in. standard tap shank size, including long shank taper taps.

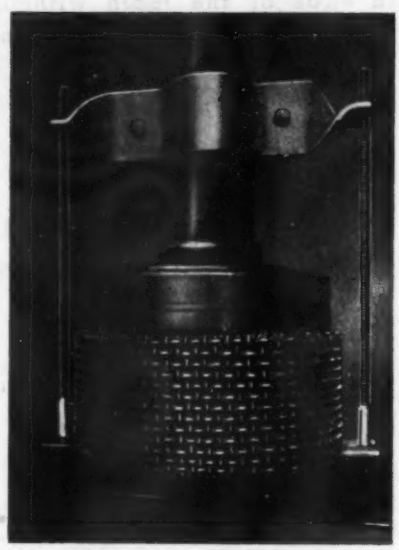
Allis-Chalmers Introduces Quiet Arc AC-DC Electrodes

A new line of smooth-flowing arc welding electrodes with quiet arc characteristics has been announced by the Allis-Chalmers Manufacturing Co., Milwaukee 1. The new electrodes, both a.-c. and d.-c. types, use the standard American Welding Society number and color.

Metex Coolant Strainer for Machine Tool Pump Intakes

Metal Textile Corporation, 4 Central Ave., Orange, N. J., announces a new development of the Metex knit wire mesh coolant strainer, designed for use over the base intake of immersed centrifugal pumps in grinders, automatic screw machines and other machine tools.

Bolted to the pump shaft, the fixture centers the strainer, draws it up on threaded bolts and seals it over the intake; the feet or lugs of the pump base casting imbed themselves in the mesh.



Metex coolant strainer

ROLLING STEEL FOR WAR

YET READY FOR PEACE

Watching the white-hot bars of steel run the course of this modern continuous bar mill—going faster and faster, growing longer and longer—stimulates pride in war steel production in America and gives assurance of an abundance of steel for use in a world at peace.

For this unique J&L bar mill — as well as other bar mills throughout the industry — is as adaptable as steel itself; the strongest, most versatile metal. Without change of pace, the rhythm of its rolling took up the song of steel in battle: steel for planes, tanks, shells, ships and guns.

At war's end these mills will keep on rolling steel—without pause for conversion—steel bars for automobiles, for railroads, for industry, for farms—new and better steels for daily living and employment.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

J&L STEEL

CONTROLLED QUALITY STEEL FOR WAR

STEEL MILL MUSIC

Steel mill music is a thunderous, rumbling of overtones and undertones in a big, modern rolling mill that blend into a roaring symphony. To a visitor, it is just a deafening noise, but to the skilled crews that operate the mill it has a definite rhythm. If the workmen at their posts hear the faintest dissonance, each man is instantly alert to find out quickly what is causing the discord, as it may signal something amiss. Ears trained by years of listening to steel mill music can spot an off-beat in the great rhythmic noise as quickly as a conductor can spot one in a big orchestra.

World record for steel bars from any bar mill, 44,125 tons in one month, was rolled on the Jones & Laughlin No. 18 mill (see illustration) in January this year, a tribute to highly skilled workmen who operate it, and to J&L engineers who in 1931 pioneered in designing the new type mill.

A deep rose-red glow illuminates rolls, men and interior of this unique J&L 14-inch bar mill as red-hot billets being rolled into rounds, flats, hexagons, squares and special shapes speed through several stands of rolls on their way up and down and across the mill's great expanse (large enough to cover five football fields). This mill is so vast that as many as twelve steel sections are in process at one time — totaling at finish as long as ½ mile — and so fast that time from billet to finished bar is less than two minutes.

Iron works on a flat boat is what the astonished citizenry along the Monongahela River in 1850 saw being pushed by a steamboat down the 60 miles from Brownsville to Pittsburgh. The iron works belonged to twenty-six year old B. F. Jones. He had purchased the plant with his earnings as a partner in a canal boat freight service. Young Jones dismantled his furnaces and mill and transported them to Pittsburgh, foreseeing the development there. This was the beginning of the Jones & Laughlin Steel Corporation, today fourth largest steel producer.

Conestoga freight wagons, and canal boats transported to eastern markets the puddled iron bars, flats, plates, shapes, bands, cold rolled iron bars, and cut nails that in the 1850's were the pioneers of a long line of J&L products to follow.

Stoutly Dutch-built in a valley in eastern Pennsylvania once occupied by Conestoga Indians, the blue and red Conestoga wagons with rakish, overshot canvas tops, were pulled across the rugged trails of the Alleghenies by 4- and 6-horse teams hauling freight.

Stogies, a popular smoke to this day in the Pittsburgh district, were long, thin, black cigars brought west from tobacco plantations in eastern Pennsylvania by Conestoga wagon drivers, who hauled back iron products. These stout smokes were called "Conestogie" cigars, soon shortened to stogies.

Parts and Materials

Clarostat wire-wound control

Clarostat Announces New Model Wire-Wound Control

A new version of its type 58 wire-wound potentiometer or rheostat has been released by Clarostat Manufacturing Company, 285-7 N. 6 St., Brooklyn, N. Y. This is said to be a still tougher control capable of coping wth extreme vibration and mechanical abuse such as is encountered in wartime service, in additon to its electrical ruggedness.

The new design differs somewhat from the previous type 58. A metal strap on the shaft face provides for the two-position locating pin which cannot break or tear off. The metal strap grounds the metal cover which is clinched to it. The cover is keyed in place on the casing and will not loosen or turn.

The center rail and terminal comprise one piece. There is also a direct connection between winding and the "L" and "R" terminal lugs. Terminals are so constructed that melted solder cannot get inside the case.

Western Reserve Introduces Rust Inhibitor and Remover

Western Reserve Laboratories, 1440 West 3 St., Cleveland 13, has available manganesed-phospholene No. 7 which it describes as combining chemically with iron, steel or zinc to form a non-metallic moisture and water-proof coating that becomes integral with the metal but does not change tolerances.

It is said to remove rust through chemical action, without rubbing or scraping. It is also said that paint, lacquer, enamel, plating anchors securely to manganesed-phospholene treated metal and will not peel off. Rust-resisting crystals become a part of the treated metal.

Dixon Company Graphite Lubricant Slipstick Ready

Slipstik, a medium-soft wax-like graphite lubricant in handy solid form has been introduced by Joseph Dixon Crucible Co., Jersey City 3, N. J.

It is described as affording fast rub-on lubrication and as being easy to apply. It is enclosed in a cylinder

Dixon Crucible Slipstik

3 in. long, 7/8 in. in dia. Each end is provided with a disc; by pressing one disc inward, the stick is ejected to the required length for application.

U. S. Rubber Develops Improved Latex Insulation

Nubun, a new synthetic rubber latex insulation for power, lighting and communication cable has been developed by United States Rubber Co., Rockefeller Center, New York, N. Y.

Qualities cited for Nubun include, flexibility, impermeability to water, laminated construction and perfect centering of the conductor to produce an insulated wire of maximum conductivity and minimum diameter. The synthetic insulation is said to be exceptionally homogeneous following vulcanization and has high di-electric strength and insulation resistance.

Philco Explosion-Proof Truck Storage Battery

An explosion-proof storage battery for industrial trucks is being made by the Philco Storage Battery Division, Trenton 7, N. J. Use of this new type battery is expected to change current methods of material handling in buildings where any fire or explosion hazard exists.

The design of the explosion-proof battery is such that after the industrial truck in which it is used leaves the battery-charging station, all of the component parts are locked shut and cannot be opened until the truck is returned to the battery-charging station.

HVWM Announces Bright Alloy Plate for Electrical Products

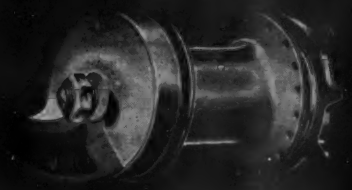
The Hanson-Van Winkle-Munning Co., Matawan, N. J., announces a bright alloy plating process which imparts a coating of copper, tin and zinc.

Alloy anodes of the same composition as the deposit have been perfected; thus the metal concentration of the bath can be maintained automatically.

Nickel, gold, silver, copper and many other metals can be plated over or under this alloy deposit. Chromium can be applied directly over the alloy deposit. Except in cases where the alloy deposit is to be further plated, special rinses or treatments are not required.

Jessop Produces Light Gage Stainless-Clad Steel Sheets

Jessop Steel Co., Washington, Pa., through the addition of new production equipment, is now able to furnish fabricators with light gage stainless-clad steel sheets. Thicknesses from 16 to 12 gage can now be produced in widths from 24 to 50 in. and in lengths up to 120 in. The 18 gage can be furnished in all the above widths and up to 96 in. in lengths. Polished sheets are available in all sizes up to 48 in. wide.



First Bicycle Coaster Brake

First Yellow Taxicab

First Engine with Cylinders Cast en Bloc

Famous "Firsts"

by NEW DEPARTURE

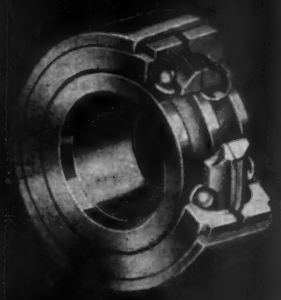
The name New Departure aptly describes an organization whose thought and action has ever been in advance of its time.

A partial record of the "new departures by New Departure is reported on this page.

Well over 200 million New Departure ball bearings are in this war, and we will stay with this task until the job is done.

But your postwar plans for anti-friction bearings might well take advantage of New Departure's creative engineering.

New Departure, Division of General Motors, Bristol, Connecticut. Detroit, Chicago and Los Angeles.



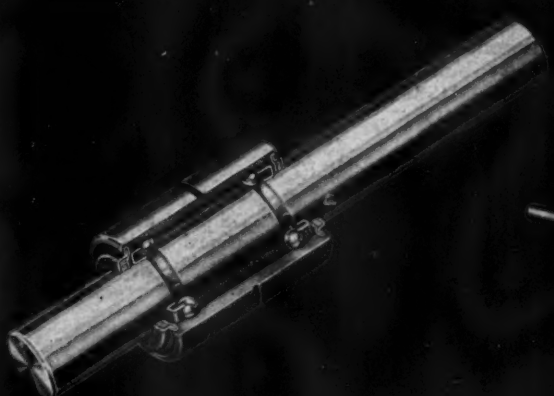
First Dual-Purpose Ball Bearing

First Conveyor Roll Bearing

First Self-Sealed Bearing Lubricated-for-Life

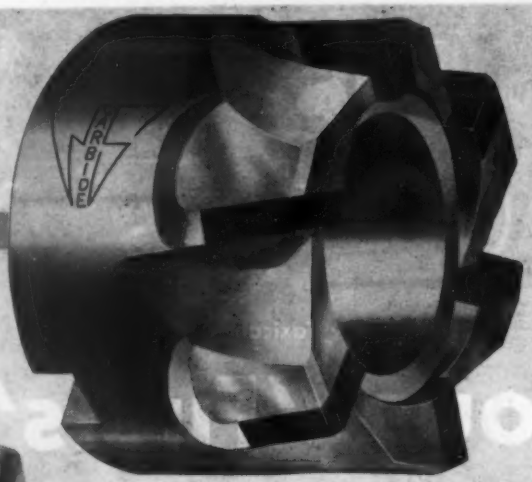
First Successful Treadle Roll Bearing for Textile Looms

First Self-Sealed Lubricated-for-Life Mine Car Bearing



First Pump Shaft Bearing Self-Sealed and Lubricated-for-Life

Rockwell Hardness Tester



No. SSM Shell End Mills, for machining steel. Standard sizes from 1¼" to 6" diameters, 4 to 10 teeth.

No. SEM Shell End Mills, for machining cast iron and non-ferrous materials. Standard sizes from 1¼" to 6" diameters, 4 to 8 teeth.

Boost output

AS MUCH AS

10 times

. . . with these new

STANDARD CARBIDE TIPPED

SHELL END MILLS

UP TO 10 TIMES greater output and 4 times longer life between sharpenings, are not unusual with these new Wendt-Sonis Carbide Tipped Shell End Mills that employ a negative rake design feature. Consider these desirable advantages:

1. 20" feed compared to a 2" feed of HSS end mill
2. Increased surface feet per minute
3. 25% longer carbide tips
4. Faster, cleaner cutting . . . finer finishes

Carbide Tipped Tools are a specialty with us. We make them exclusively. Our experience, research, development and improvements are your assurance of complete satisfaction when you use W-S Carbide Tipped Tools.

Refer to "TOOLS" in your Classified Telephone Directory, for your nearest W-S Distributor, or write WENDT-SONIS COMPANY, HANNIBAL, MISSOURI. Branch Warehouse: LONG BEACH, CALIFORNIA.

NEW! **CATALOG 144** just off the press. Contains data and latest prices on W-S Shell End Mills plus many standardized carbide-tipped tools formerly classed as "special." WRITE TODAY for your FREE copy.

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CARBIDE TIPPED CUTTING TOOLS

BORING TOOLS • CENTERS • COUNTERBORES • SPOTFACERS • CUT-OFF TOOLS • DRILLS • END MILLS • FLY CUTTERS • TOOL BITS • MILLING CUTTERS • REAMERS • ROLLER TURNING TOOLS • ROUTER BITS • SPECIAL TOOLS

TRADE PUBLICATIONS

BROACHING Copies of Bulletin VDS-44, containing sixteen pages of information on its line of standard Pull-up broaching machines, tools and attachments, may be obtained from the Colonial Broach Co., P. O. Box 37, Harper Station, Detroit 13, Mich. The line ranges in size from 6 tons and a 36-in. stroke to 25 tons and a 60-in. stroke, and is primarily used for the internal broaching of rounds, splines, squares, gear teeth and other similar applications.

CONTROLS The Wheelco Instruments Co., Chicago 7, Ill., has issued four pieces of literature on controls. Bulletin J303-2 covers the features, operation and specifications of the Rheotrol, a device to maintain a desired electric power or heat input, or flow of liquids or gases to any process or equipment. The new automatic and manual type Inputrols are featured in Bulletins J403-2 and J402-2. These instruments are simple fied electrical timing devices which, when used with any automatic control instrument having a high and low contact with a neutral position, maintain desired input of electrical power, heat or flow of liquid or gases to any process equipment. Bulletin J602-2 describes the new Throttitrol, a simplified valve positioning device used in conjunction with any control instrument having a high and low contact with a neutral position.

FASTENING Bardwell & McAlister, Inc., 911 North Orange Drive, Hollywood 28, Cal., has issued a new and revised Rosan Locking System Standard Catalog. The operation and application of the system are thoroughly explained and engineering standards, service data and design information given for the line of Rosan locked-in threaded inserts and studs.

GAGES Metrical Laboratories, Inc., 402 Detroit St., Ann Arbor, Mich., has released a bulletin on external indicating gages. Particular emphasis is placed on the use of indicating rings of a snap gage type, used for the O. D. measurement of external diameters to an extremely high degree of accuracy. This gage can be applied while the part is in the machine and makes readings as close as 0.000025 in. Other gages discussed are those designed to measure slot and thickness, and an indicating ring gage designed to measure three-cornered condition of parts ground on a centerless grinder.

GEARS Its complete line of improved Model 860-A gear finishing machines, operating on the crossed-axis gear shaving principle, are described in Bulletin No. 860A44 available from the Michigan Tool Co., 7171 E. McNichols

Road, Detroit 12, Mich. Complete specifications for all sizes as well as a list of standard and special equipment items are included.

LAYOUT The Barco Scraping Co., 1975 East 65 St., Cleveland 3, Ohio, has prepared a folder on its line of accuracy equipment including surface plates, angle irons, stands, straight edges, parallels, gage blocks and other checking items, all made of Meehanite. The various items are illustrated and sizes and specifications given on the surface plates, angle irons and straight edges.

MEASURING Bulletin No. P1202, with 12 pages of information on the application, operation and design of Bristol radiation pyrometers, has been prepared by The Bristol Co., Waterbury 91, Conn. Also included is a detailed explanation of the principle of operation of the radiation unit, and complete data regarding ranges, mountings and accessories.

MILLING W. H. Nichols & Sons, Waltham, Mass., has released a picture catalog featuring the design and uses to which the Nicholas miller can be put. Pictorially, the catalog describes each application of the machine and presents its various construction highlights.

POWDER METALLURGY A 168-page book, designed to provide industry with a complete knowledge of the wide variety of powder metal bearings and parts now being produced by Chrysler under its Oilite trade name, may be secured by writing Amplex Div., Chrysler Corp., 6501 Harper Ave., Detroit 31, Mich. A 23-page engineering section covers such subjects as specifications, design features and practice, shaft clearance, load rating charts, recommended methods of sizing, tolerance data, drawings and tables on chamfers and fillets, easy machining methods and a treatise on lubrication.

WELDING A new method for increasing the speed of welding mild steel called "Fleet-Welding" is presented in a 48-page booklet published by The Lincoln Electric Co., Cleveland, Ohio. Besides completely describing the process, the book contains many photos and drawings illustrating the technique. Also included are procedure tables which list plate thickness, electrode size, current, melt-off rate, arc speed and other such pertinent data.

WELDING CONTROL Bulletin No. WTH-44, containing descriptions, applications, specifications and features of the new improved line of "package unit" heat controls, has been released by Weltronic Co., 19500 West Eight Mile Road, Detroit 19, Mich. Stock models being manufactured are listed in the bulletin together with explanations of the applications of these con-

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Whenever you need to check the depth of holes or slots you can't beat a Lufkin Micrometer Depth Gage for all-around convenience and accuracy.

Each gage is provided with three rods (5/32" diameter) which permit measurements from zero to three inches by thousandths. Additional rods are available for measuring up to 6 inches. Adjustable nut to compensate for wear. Patented lock nut locks the rod at any desired point, maintaining reading and often preventing errors. Available with 3" or 5" base, knurled surface on top affording the firm hold essential for accurate measurements. See your dealer and write for complete Lufkin catalog.

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THESE HAVE A BEARING ON THE LENGTH OF THE WAR

Inner bearing-races, perfectly machined, for an amazing instrument that speeds Allied progress and hastens total victory. They must be held to very close tolerances and carefully finished—and they must be turned out by the thousands on a mass-production basis.

Cut from stainless-steel tubing, the inside diameter and the back face of the flange are ground at the same setting. Then, placed on a mandrel locating from the inside diameter and the back face of the flange, the O.D. and the inside face are ground. Finally, the back face is reground to hold flange-thickness and overall length.

This kind of work is typical of Ace ingenuity. Here under one roof are the facilities and abilities to turn-out small parts and assemblies requiring stamping, machining, heat-treating, and grinding with speed and economy. Send sample, sketch, or blueprint for quotation.

A good booklet to have around. Send for a copy.

ACE

ACE MANUFACTURING CORPORATION

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trol units to single point, multiple point, pulsation and automatic heat rise welding. Detailed specifications and photos of the various models are also included.

WELDING ELECTRODES A new line of arc welding electrodes are described in Bulletin B6340 announced by the Allis-Chalmers Mfg. Co., Milwaukee, Wis. The bulletin also gives prices, zone classifications, freight policy, quantity discounts and term explanations.

WELDING SYMBOLS A wall chart, illustrating the basic characters of welding symbols recommended as American Standard by the American Welding Society, has been published by The Hobart Brothers Co., Troy, Ohio. The graphical language of the welding industry is illustrated separately for fusion welding, for resistance welding and for those requiring both fusion and resistance welding. Twenty-three typical welded joints and sections, covering butt welds, lap welds, tee welds, corner welds and edge welds are illustrated and marked with standard welding symbols applying to that particular joint or section.

X-RAY Picker X-Ray Corp., 300 Fourth Ave., New York, N. Y., has issued a bulletin on its 50 KV industrial X-Ray unit. It is said to be shockproof, ray-proof and is rated for continuous operation over long periods. The unit is recommended for the nondestructive examination of light metal alloys, thin sections of heavier metals, and such low density items as plastics, plywoods, leather, textiles and ceramics.

SEEN and HEARD

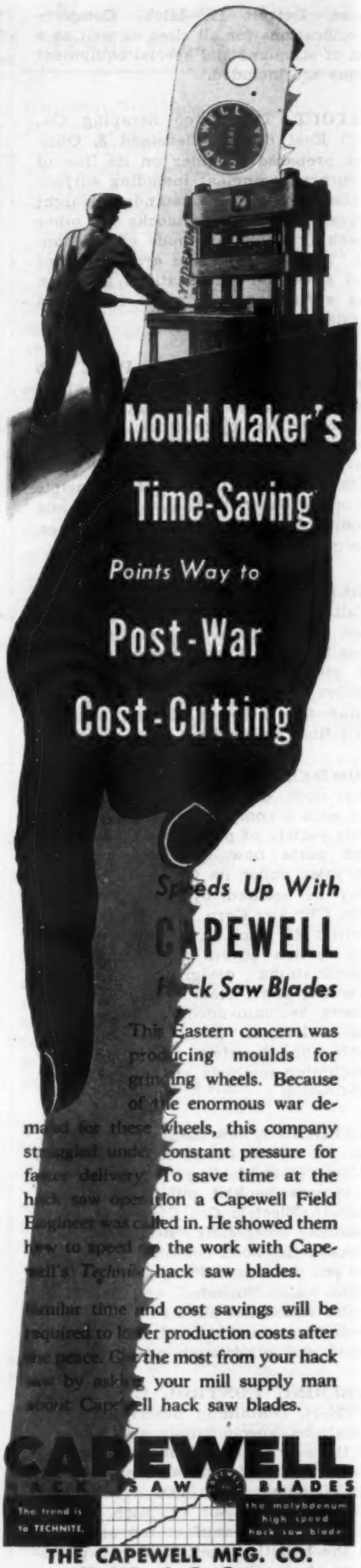
By JOHN R. GODFREY

Boosting Production On Old Machines

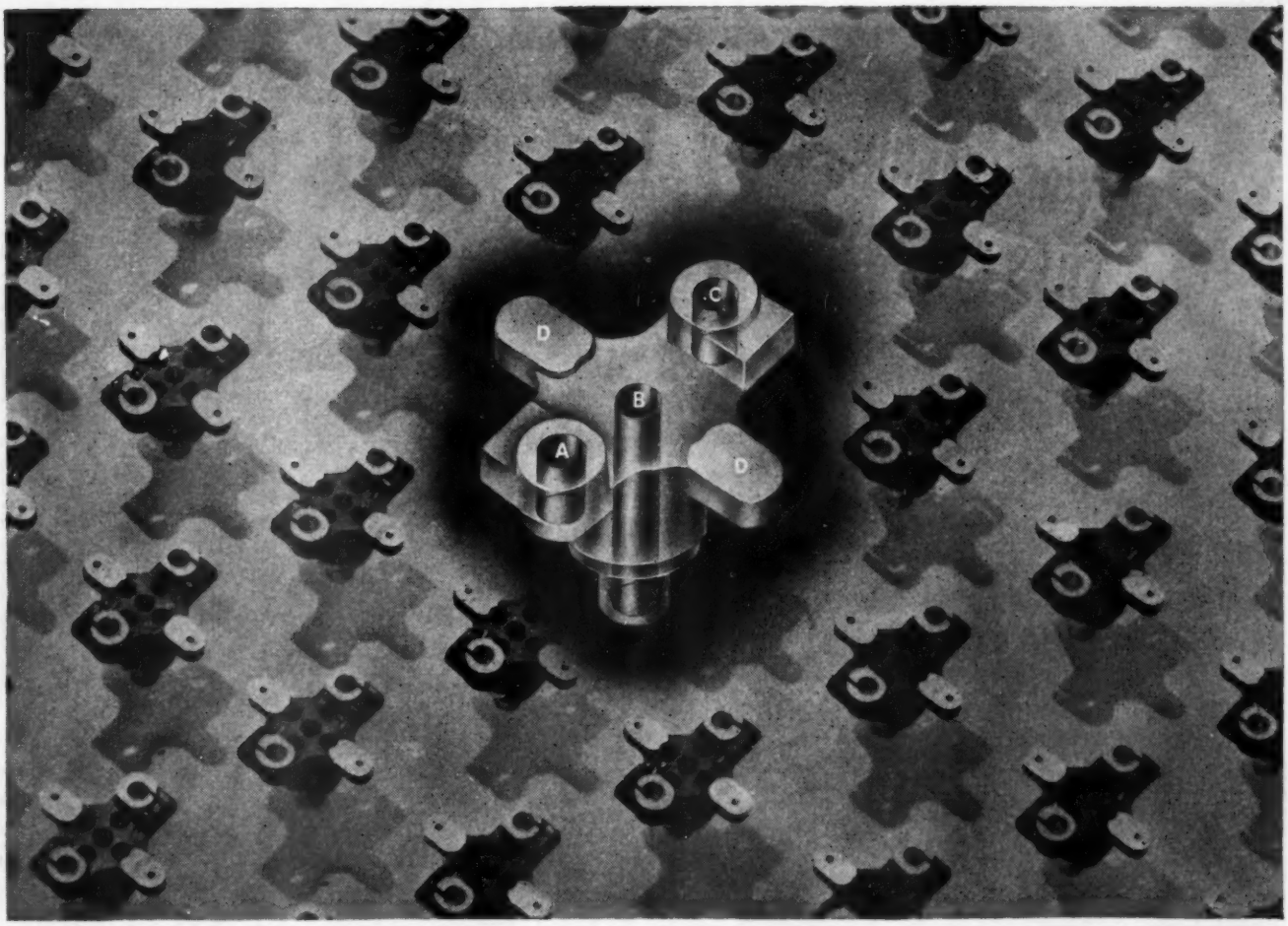
TOO MANY SHOP MEN pass up the high-speed milling data that is being released in the belief that this only applies to new and powerful machines. Not so with the Underwood Typewriter Company men. They tried to see what could be done on the 20-year old millers they had on jobs. They studied the data sheets and promptly got busy.

Cutters with carbide inserts and putting a fly-wheel on the spindle gave them the increased production they needed—and not just a little increase either. On a long run it figured up to 171 percent. When they can get new machines the production will go up still more; but they are getting a big boost *now*, when they need it.

It pays to see what can be done with your present equipment; to take advantage of others' experience in every way possible.


Mould Maker's
Time-Saving
Points Way to
Post-War
Cost-Cutting
Speeds Up With
CAPEWELL
Hack Saw Blades
This Eastern concern was producing moulds for grinding wheels. Because of the enormous war demand for these wheels, this company struggled under constant pressure for faster delivery. To save time at the hack saw operation a Capewell Field Engineer was called in. He showed them how to speed up the work with Capewell's Technite hack saw blades.
Similar time and cost savings will be required to lower production costs after the peace. Get the most from your hack saw by asking your mill supply man about Capewell hack saw blades.
CAPEWELL
HACK SAW BLADES
The trend is to TECHNITE.
the molybdenum high speed hack saw blade

THE CAPEWELL MFG. CO.
Hartford, 2, Conn.

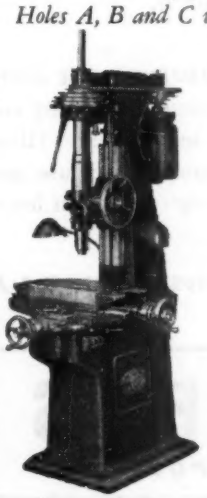


How to use the *Moore Jig Borer* as a Production Machine

Three holes located and sized, two pads milled—in a single set-up; 5,000 aluminum parts—6 minutes each. Are you limiting the capacity of your jig borer by using it only on toolroom work? You needn't...if it's a Moore Jig Borer.

For this versatile machine not only adds toolroom accuracy to your production jobs but often outperforms special-purpose machines. Here's proof on a run of 5,000 aluminum parts:

Holes A, B and C were located to a tolerance of .0005", sized to + .0005",—.0000"...had to be parallel to .001" checked on plugs 1" long...two pads D milled to ±.001".



In order to hold these pads in close relation to the holes, the job was done in a single set-up.

A drill jig couldn't handle such close tolerances; reamers and bushings would wear. Since aluminum is not free-machining, a good finish would be difficult to obtain with reamers.

The only answer was single-point boring. After the holes were roughed out with a jig costing $75, the Moore Jig Borer machined them to exact location and size. The entire operation, including the machining of the two pads, required only six minutes each and reduced appreciably all previous costs.

Such speed and accuracy are the result of the Moore Jig Borer's sensitive spindle which provides speeds to 2,600 RPM, and quick-setting lead screws. The latter, ground to an accuracy of .0002" in 16", enables you to spot, drill, bore and ream holes in one set up, with minimum tool changes.

Remember this versatility when you specify your next jig borer. Meanwhile, write for illustrated literature.

MOORE SPECIAL TOOL CO., INC.
738 UNION AVENUE, BRIDGEPORT 7, CONN.

MOORE JIG BORER

MOORE TOOLS

SPOTS, DRILLS, BORES, REAMS...WITH MINIMUM TOOL CHANGES

THEY'RE LEARNING ABOUT FILES "OVER THERE"

"Ordnance hospital" scene somewhere near the fighting front . . . "operating" on an injured machine-gun. U. S. Army Signal Corps photo.

IN ORDNANCE WORK, where field repairs are varied and numerous, thousands of army-trained mechanics are having plenty of opportunity for making file comparisons. These are sure to influence their preferences when they return to the peace-time industrial work-benches.

It's a good bet that the majority will say "Nicholson Files for me!" These famous quality files, in many types, cuts and sizes, are accompanying our armed forces into every war theater — just as they have found their way into every commercial corner of the globe. And, it will be found that today, as always, Nicholson and Black Diamond Files continue to live up to their sweeping guarantee of *Twelve perfect files in every dozen.*

FREE BOOK, ***"FILE FILOSOPHY,"*** for distribution among your production, purchasing and tool-crib heads. . . . 48 informative, illustrated pages on kinds, manufacture, use and care of files. How many copies can you use — judiciously?

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(Also Canadian Plant, Port Hope, Ont.)

FOR STAINLESS STEEL—one of the many Nicholson Special Purpose Files. Has extra-tough, high-top teeth—and is otherwise specially designed to resist the abrasive action of stainless steel's hard chromium and nickel content.

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NICHOLSON FILES
FOR EVERY PURPOSE

Marvels of Electronics—

and the steelmaking skill of Follansbee

Many of the electrical and electronic devices which are providing a margin of superiority to our fighting men are necessarily closely guarded military secrets. But it is no secret that their manufacture requires new standards in the production of Electrical Sheets.

The need for such combinations in high silicon steels as thin sheets to close gauge tolerances, exceptionally clean surfaces and excellent punching qualities, together with essential magnetic characteristics, created problems never before encountered in the tonnage production of Electrical Sheets.

The success of Follansbee in quickly meeting these new standards is evidence of the skill of its compact, highly trained organization. It is an important reason why you can entrust these and other difficult steelmaking jobs to Follansbee.

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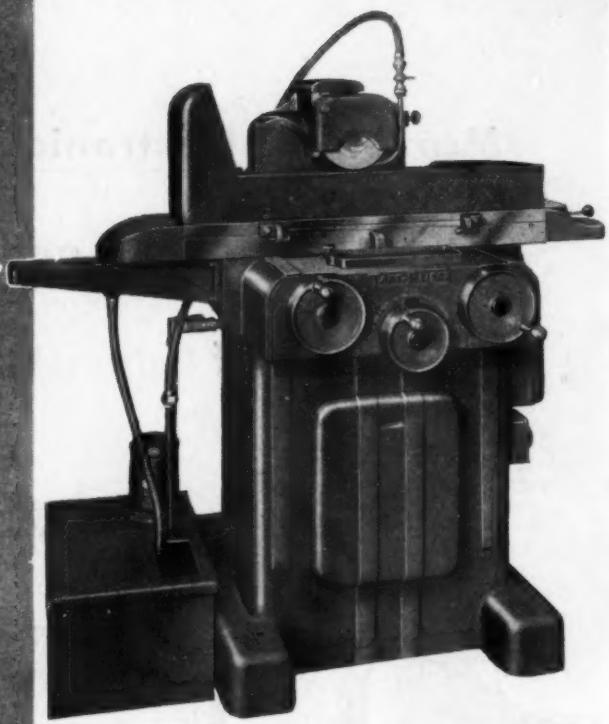
ALLOY BLOOMS, BILLETS, BARS, SHEETS & STRIP • COLD ROLLED SHEETS & STRIP
POLISHED BLUE SHEETS • ELECTRICAL SHEETS & STRIP • SEAMLESS TERNE ROLL ROOFING

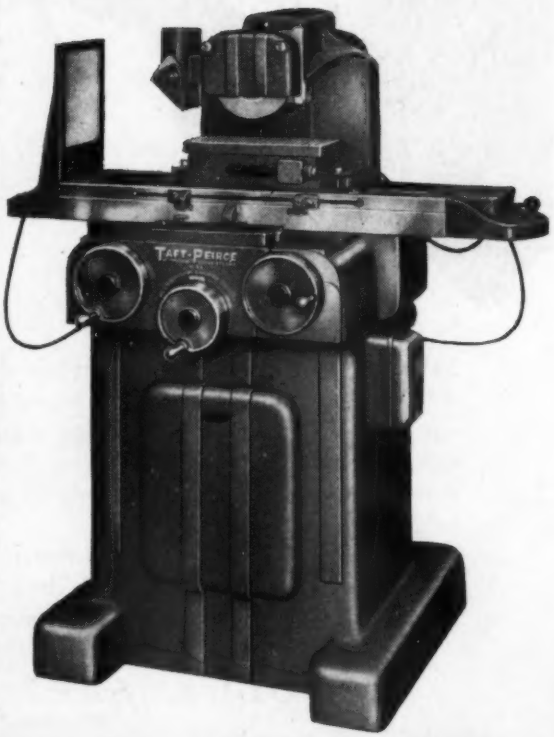
Wet...



At right is the No. 1 Precision Surface Grinder with wet-grinding attachment, consisting of welded steel coolant tank, baffled for proper settling, coolant pump, splash guards, drain trough, and wheel guards. It is easy to install on machines now in service.

YOU CAN DO EITHER TYPE OF GRINDING WITH THE TAFT-PEIRCE NO. 1 PRECISION SURFACE GRINDER

Dry...



At right is the standard model of the No. 1 — an entirely different type of machine which opens up new frontiers of precision on small tools and parts. Exceptional accuracy of flatness is readily maintained; grinding time and wheel wear are sharply reduced; operation is almost effortless. And the exclusive Taft-Peirce *tilting wheelhead* speeds and simplifies angular work.

THE TAFT-PEIRCE MANUFACTURING CO.
WOONSOCKET, RHODE ISLAND

IT TAKES A LOT OF *know-how* TO DESIGN AN *Engineered* SCREW RECESS

. . . . AND THE PHILLIPS RECESS HAS WHAT IT TAKES!

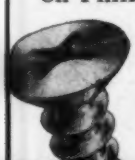
TAKE A LOOK at the center corners of the Phillips Recess above – and get a picture of some real screw engineering!

THESE CORNERS *aren't square!* They're rounded into a series of 16 flat planes. It's these flat planes that *hold* drivers in the Phillips Recess so well.

THEN NOTICE how the 4 wings and the 16 flat planes are angled. It's the scientifically determined degree of these angles that eliminates fumbling starts . . . makes it possible to use full turning power . . . makes it hard to burr Phillips Head Screws, and reduces wear on Phillips Bits and Drivers.

FOR ANOTHER INSTANCE of Phillips engineering ingenuity, note the depth of the Phillips Recess. It's not too deep . . . not too shallow. It's just the right depth to give Phillips Recessed Head Screws the strength to stand up under the heaviest driving pressures. Just the right depth to give maximum turning power with a minimum of effort . . . to keep drivers in proper alignment with screws!

COST LESS! Switch to screws with the scientifically engineered Phillips Recess — they cost less because they help you produce more! Available in any head style, type, or size.



PHILLIPS *Recessed Head* SCREWS

WOOD SCREWS · MACHINE SCREWS · SELF-TAPPING SCREWS · STOVE BOLTS

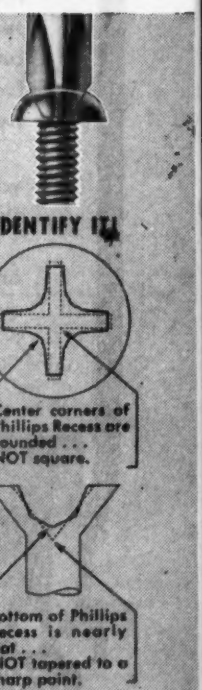
TO MAKE WARTIME QUOTAS AND PEACETIME PROFITS

Faster Starting: Driver point automatically centers in the Phillips Recess . . . fits snugly. Fumbling, wobbly starts, slant driving are eliminated. Work is made trouble-proof for green hands.

Faster Driving: Spiral and power driving are made practical. Driver won't slip from recess to spoil material or injure worker. (Average time saving is 50%.)

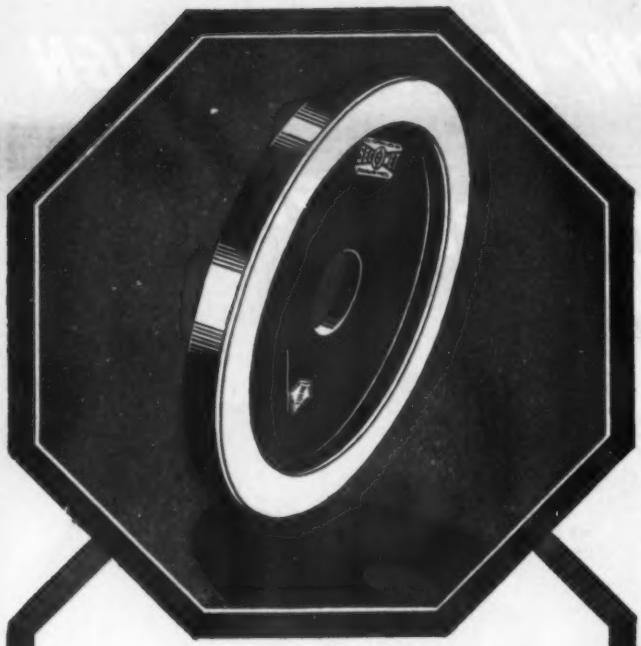
Easier Driving: Turning power is fully utilized. Workers maintain speed without tiring.

Better Fastening: Screws are set-up uniformly tight, without burring or breaking of screw heads. The job is stronger, and the ornamental recess adds to appearance.


IDENTIFY IT!
Center corners of Phillips Recess are rounded . . . NOT square.
bottom of Phillips Recess is nearly flat . . . NOT tapered to a sharp point.

24 SOURCES

American Screw Co., Providence, R. I.
Atlantic Screw Works, Hartford, Conn.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
General Screw Mfg. Co., Chicago, Ill.
The H. M. Harper Co., Chicago, Ill.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
Manufacturers Screw Products, Chicago, Ill.
Milford Rivet and Machine Co., Milford, Conn.
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Reading Screw Co., Norristown, Pa.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterville, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Wolverine Bolt Co., Detroit, Mich.



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DIAMOND WHEELS

Resinoid-bonded **for grinding of carbide-tipped tools in large quantities, or on a production basis. Their extremely fast cutting action provides rapid stock removal. Also for fixed feed, precision grinding operations, such as cylindrical, surfacing, internal and cutter grinding, because of their free and cool cutting action and ability to hold size.**

Metal-bonded **for off-hand grinding, where the cutting surface is sometimes subjected to extreme abrading action.**

Made in all standard types and diameters, in diamond concentrations to suit your requirements.

Catalog on request.

J. K. SMIT & SONS

157 Chambers St., New York 7, N.Y. 6400 Tireman Ave., Detroit 4, Mich.

Super Materials Tool Headquarters

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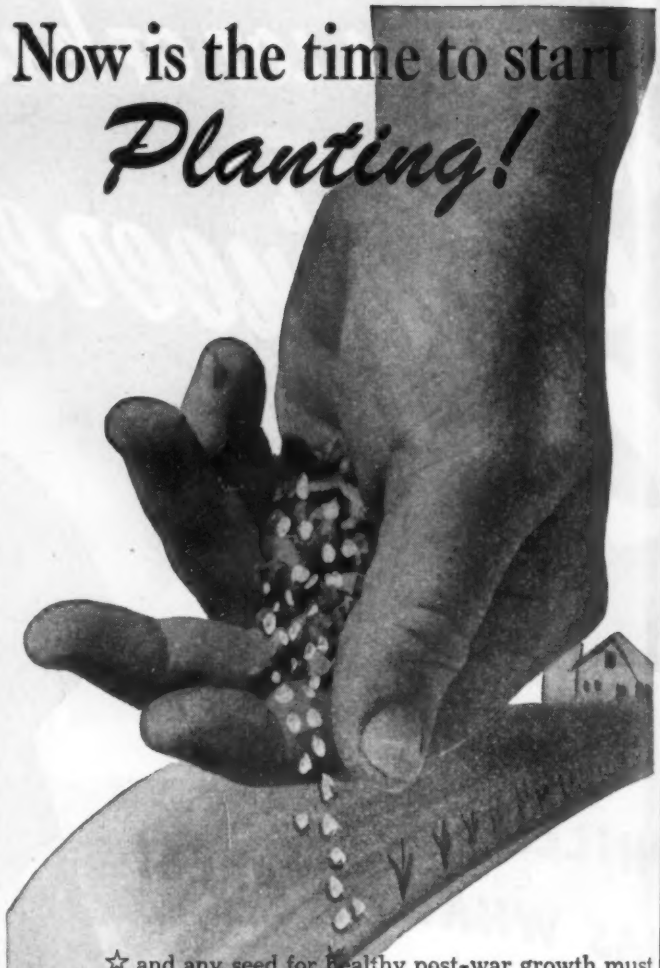
Now is the time to start *Planting!*



☆ and any seed for healthy post-war growth must include the new elements that contributed so much to victory.

OH-38 Aluminum Alloy—an exclusive Hedstrom product—has proven its superiority in hundreds of war products and permissible civilian items. You will want it for the component parts of your new and improved products—for parts that can be made better, faster, cheaper—with OH-38.

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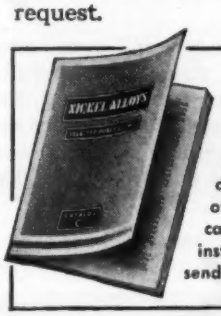
NICKEL AIDS IN THE AUTOMOTIVE INDUSTRY

to SPEED 'EM UP!

The ingenuity and experience of automotive engineers made possible the design of military vehicles, engineered for quality and quantity production in numbers that amazed the world. This kind of engineering-thinking pioneered the application of Nickel alloyed materials and foreshadows new achievements in the realm of peacetime automotive transportation.

In steering knuckles or differentials, in forged gears or cast blocks, a little Nickel goes a long way to provide essential dependability. It improves strength/weight ratios, increases wear and corrosion resistance, imparts toughness, and assures uniform properties of the metals with which it is combined.

For years the technical staffs of International Nickel have been privileged to cooperate with automotive engineers and production men. Counsel, and printed data about the selection, fabrication and heat treatment of ferrous and non-ferrous metals is available upon request.



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THE INTERNATIONAL NICKEL COMPANY, INC., *67 Wall St., New York 5, N. Y.*

Blueprint for Invasion

Your invasion will come soon . . . invasion of peace-time markets. Naturally you will take full advantage of war production experience. Any user will tell you that H-W Taps produce more, wear longer and spoil less because of the "Hanson Process" of finishing after hardening which insures uniform grain structure from tip to shank. Be sure that H-W Taps are included in your blue-print for invasion.

ARMY E NAVY

THE HANSON WHITNEY MACHINE CO.

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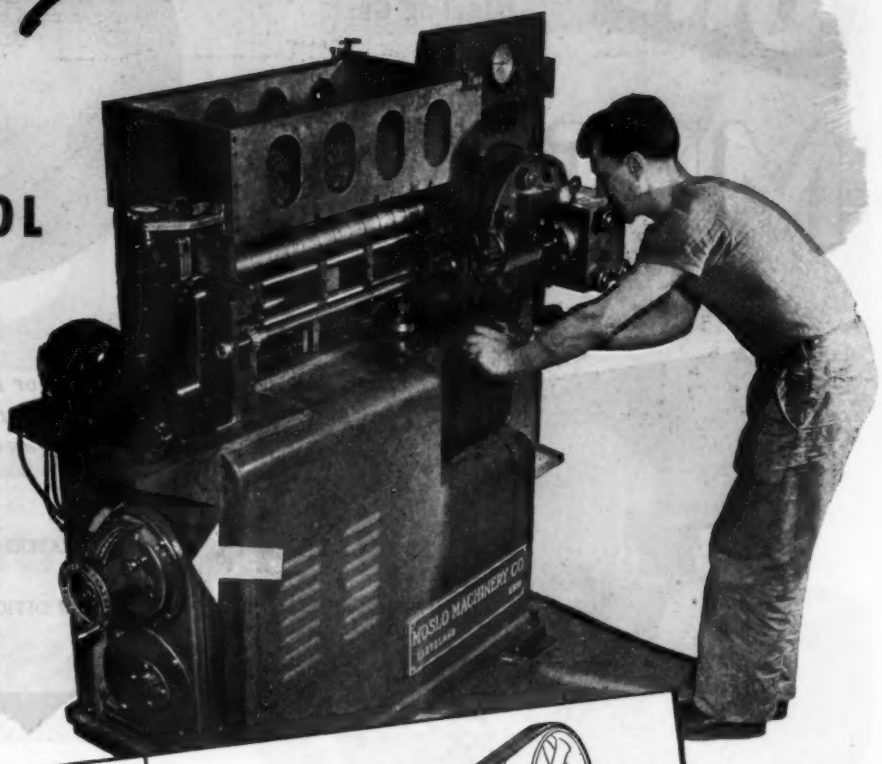
Industry's Preferred

METHOD OF SPEED CONTROL



The definite preference of plant superintendents, machine shop foremen, expediters and operators for REEVES Variable Speed Control is not hard to understand. No other speed control is so flexible, so infinitely variable, so positive and dependable in operation. No other offers so many types and sizes of units to meet every installation requirement. Get full information from Catalog offered below.

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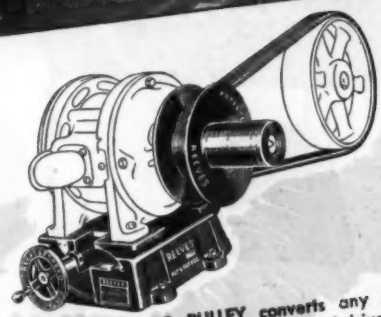
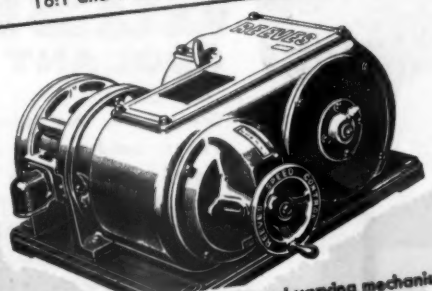
VARIABLE SPEED TRANSMISSION for infinite speed adjustability over wide range of speed ratios, 2:1 through 16:1 and in sizes to 87 horse power.



VARI-SPEED MOTOR PULLEY converts any standard constant speed motor to a variable speed drive. Sizes to 15 h.p. Speed variation within 4:1 ratio.



MOTODRIVE combines motor, speed varying mechanism, reduction gears in one compact unit. Sizes to 15 h.p. Speed variation 2:1 through 6:1.

★

NEW CATALOG

This authoritative 128-page book on variable speed control describes the complete REEVES line of speed control equipment. Ask for Catalog-Manual A.

★

REEVES *Accurate Variable* Speed Control

CM METEOR

Here is the Subtractor of Materials Handling Costs

Capacities from ½ ton and up. Lifting speeds from 18 to 60 feet per minute... Low headroom. Hook suspension, plain, geared or motor driven trolley.

CM Bulletin 142 illustrates and describes every operating feature that makes the CM Meteor Heavy Duty Electric Hoist an outstanding production time-saver... cutting deep into materials handling costs. Helical gears, aeroplane cooling, low headroom, safety limit brake, simplified maintenance... these and other advantages are explained in terms of operating efficiency and service life. Various types trolleys and accessory equipment, lift and speed tables, dimensions, etc., are included.

We invite you to write today.
Just ask for Bulletin•142.

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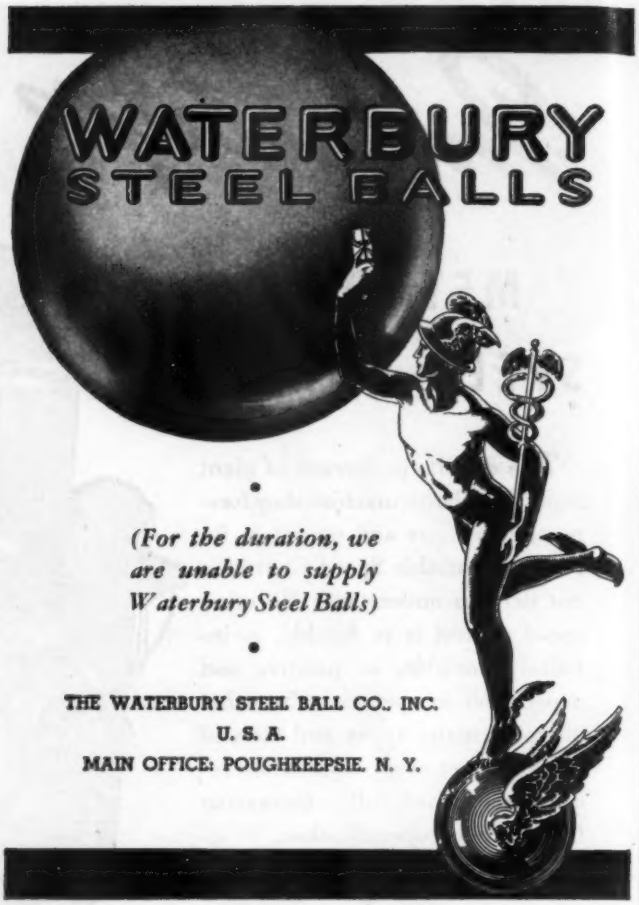
SALES OFFICES: New York, Chicago and Cleveland

WATERBURY STEEL BALLS



(For the duration, we are unable to supply Waterbury Steel Balls)

THE WATERBURY STEEL BALL CO., INC.
U. S. A.
MAIN OFFICE: POUGHKEEPSIE, N. Y.

from SMALL to LARGE!

Model TL-7320
See Section 2 of new catalogue indexed for quick reference.

Whatever your special coolant needs, they are met by

GUSHER
COOLANT PUMPS

One of the big advantages of Gusher Pumps, besides their simple design and rugged construction, is their flexibility of use, giving anything from 200 gallons per minute to the tiniest trickle since they can be throttled (according to type and size) to produce any desired flow *without injury to the pump* and without overloading motor.

The multiplicity of types and sizes available makes it easy to fit your special needs.

Write for catalogue

Gusher Pumps—Patented and Patents Pending

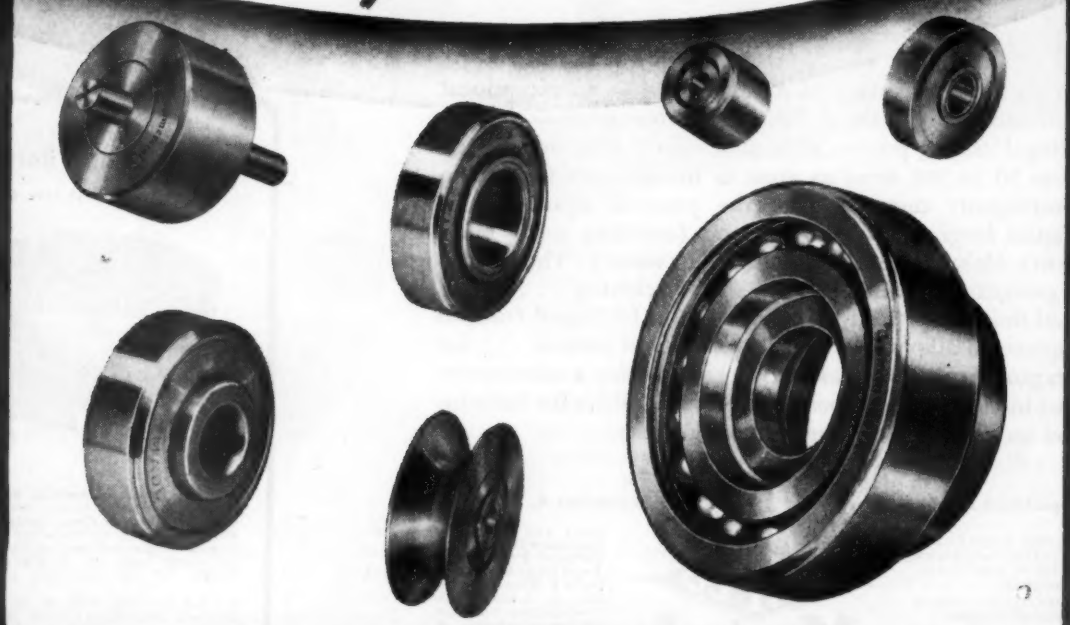
THE RUTHMAN MACHINERY CO.
1809 READING ROAD CINCINNATI 2, OHIO
The "Gusher"—A Modern Pump for Modern Machine Tools

BALL BEARINGS

MADE BY

SCHATZ

Famous for Precision Strength and Accuracy



THE SCHATZ MANUFACTURING CO.

POUGHKEEPSIE, N. Y.

REPRESENTATIVES LOCATED AT

Detroit: 2640 Book Tower—26 • Cleveland: 402 Swetland Building—15

Chicago: 902 S. Wabash Ave.—5 • Los Angeles: 5410 Wilshire Blvd.—36

Super-resistant

TO WEAR AND FAILURE

Centrifugally-cast parts of Ampco Metal lengthen life of machinery . . .

To the basic advantage of Ampco Metal — its exceptional resistance to wear, shock, fatigue, and corrosion — the centrifugal casting process adds plus values. Cast under pressures 50 to 300 times as great as in sand casting, Ampco centrifugally cast parts are the practical equivalent of "liquid forgings" — 100% sound (avoiding costly rejections), closer to finished size (saving metal). The Ampco organization furnishes all types of machining . . . rough, semi-finished, or ready for assembly . . . fabricated from an engineered alloy under close metallurgical control. . . . Let Ampco's broad facilities and experience play a constructive part in planning your post-war product. Write for bulletins and services of a competent field engineer.

A-6B

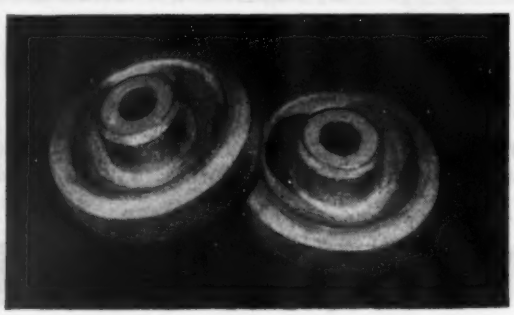
Ampco Metal, Inc.

Department AM-9 — Milwaukee 4, Wisconsin

AMPCO METAL — a superior aluminum bronze to meet your requirements.
AMPCOLOY — general industrial bronzes.
SPECIAL COPPER-BASE ALLOYS.

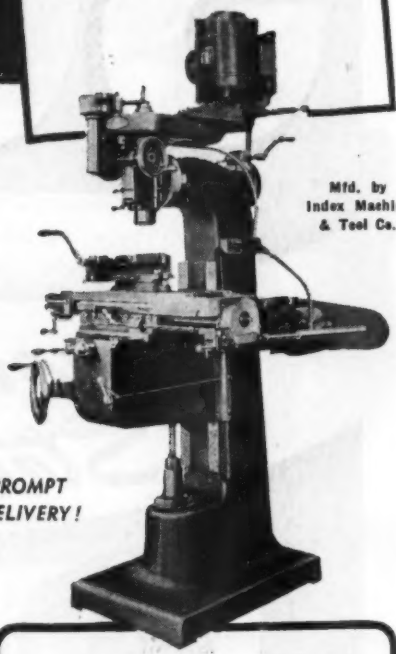
AMPCO Metal
The Metal without an Equal

Sand and Centrifugal Castings • Wrought and Extruded Products • Precision-Machined Parts • Welded Assemblies • Ampco-Trode (coated aluminum bronze welding electrodes) • Ampco Non-Sparking Safety Tools.



INDEX VERTICAL MILLS FOR THE TOOL ROOM OR PRODUCTION LINE

Milling, Drilling or Boring. Verniers or Rods and Indicators for locating. Ask the shop that has one. Better still, ask the shop that has an Index and also another of competitive make.



Mfd. by Index Machine & Tool Co.

PROMPT DELIVERY!

12" Tool Room Rotary Table

Mfd. by Index Machine & Tool Co.

A quality tool for precision work in the tool room or production line, incorporating such features as ball bearings—hardened and ground worm—quick acting throw-out for free hand turning—single movement table lock that does not cramp table out of alignment—compound trough. 12" size only.

For use on Index Mills or any other machine that will accommodate a 12" table.

BLANK and BUXTON MACHINERY

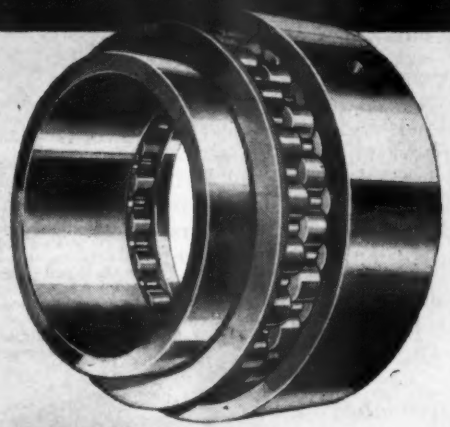
3100 E. MICHIGAN AVE.
JACKSON, MICH.

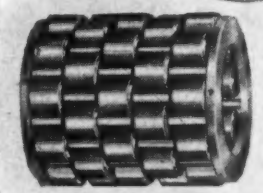
"Standing up under full load ...meeting all requirements"

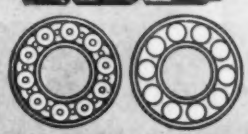
in this "NEW ENGLAND" 10-Ton After Capstan

So reports the New England Trawler Equipment Co. after several years' satisfactory use of Orange Staggered Roller Bearings on the vertical shafts of its 30" dia. Capstan Heads. These bearings withstand a load of 8,000 lbs. at 13 rpm, 20,000 lbs. at 1 rpm, and a static load of 70,000 lbs.

ORANGE "STAGGERED" ROLLER BEARINGS







The staggered roller design brings maximum roller surfaces in contact with the load, as shown by end views of an Orange Staggered Roller Bearing and a conventional roller or ball bearing.

Time and again, Orange Staggered Roller Bearings have "saved the day" for designers looking for bearings to carry extremely heavy loads in limited space or to meet severe operating conditions.

The exclusive staggered roller design provides many short rolls which distribute the load over a multiplicity of contact points. Maximum supporting area is obtained in a minimum of space. You can design to smaller sizes, because Orange Staggered Roller Bearings do the work of larger conventional bearings.

Orange Staggered Roller Bearings are available in a full range of standard, *interchangeable* sizes. Special sizes made to order. Send coupon for detailed Engineering Data Book showing design, sizes, capacities, installation data, etc.

ORANGE ROLLER BEARING CO., INC.
544 Main Street, Orange, N. J.

Mail Coupon for Engineering Data

Orange Roller Bearing Co., Inc., AM
Orange, N. J.

Please send me your Staggered Roller Bearing Data Book

Name.....Title.....

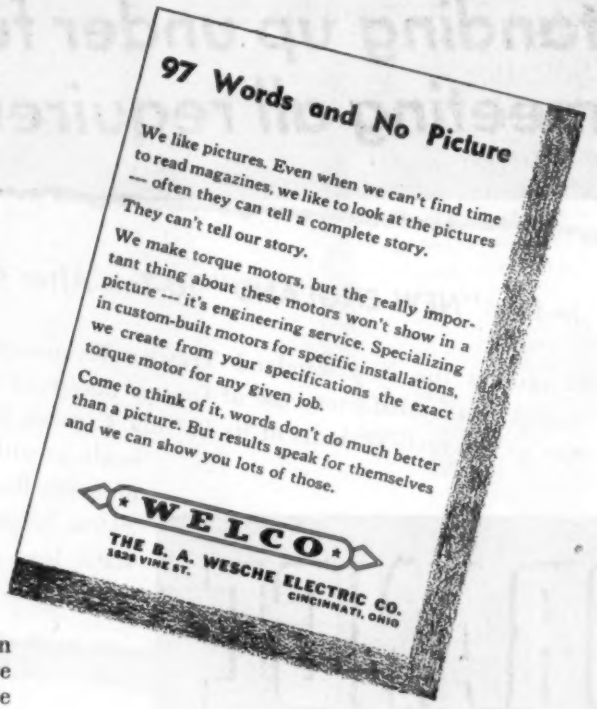
Company.....

Address.....

City.....State.....

OK,

SO THE AD WAS A STINKER!


97 Words and No Picture
We like pictures. Even when we can't find time to read magazines, we like to look at the pictures — often they can tell a complete story.
They can't tell our story.
We make torque motors, but the really important thing about these motors won't show in a picture — it's engineering service. Specializing in custom-built motors for specific installations, we create from your specifications the exact torque motor for any given job.
Come to think of it, words don't do much better than a picture. But results speak for themselves and we can show you lots of those.
WELCO
THE B. A. WESCHE ELECTRIC CO.
1626 VINE ST.
CINCINNATI, OHIO

I was about to leave for the army as an aviation cadet. I had to write one more advertisement about Welco Motors before I left. It's no fun trying to concentrate on motors when your head's in the sky. So I didn't figure it for a world beater when I turned out an ad headed "97 Words and No Picture."

I don't even remember now exactly what it said. But the general drift was that the engineering "know-how" that goes into each special custom Welco Motor can't be shown in a picture. It went on to point out that it's a good idea to use a standard motor where you can but to get in touch with Welco when your need is out of the ordinary.

There wasn't any picture—there wasn't even a fancy border.

I wasn't too surprised when an advertising magazine jumped all over me for writing such a corny ad, but I did feel kind of badly at that.

Then a funny thing happened. Several large motor users that we had never done business with just happened to need some "specials" instead of standard motors. They saw this ad and kind of liked what it had to say. They wrote and wanted to know some more about Welco.

This all happened about a year ago, but thanks to those first inquiries, Welco has some new friends and satisfied customers. The company wrote me clear across the country and wanted another ad "without pictures." I have a few minutes in the ready room this morning before my first formation flight, so here it is, Mr. Santen.*

Advertising men won't like *this* ad either—but what the hell—they don't buy many motors anyway.

S.M.** *Aviation Cadet*
3046 Army Air Forces Base Unit
Oxnard, California

*Refers to L. J. "George" Santen, President, B. A. Wesche Electric Co.

**Copywriter—in absentia to the AAF- Perry-Brown, Inc., Advertising Agency, Cincinnati.

THE B. A. WESCHE ELECTRIC CO.
1626 Vine St. Cincinnati 10, Ohio

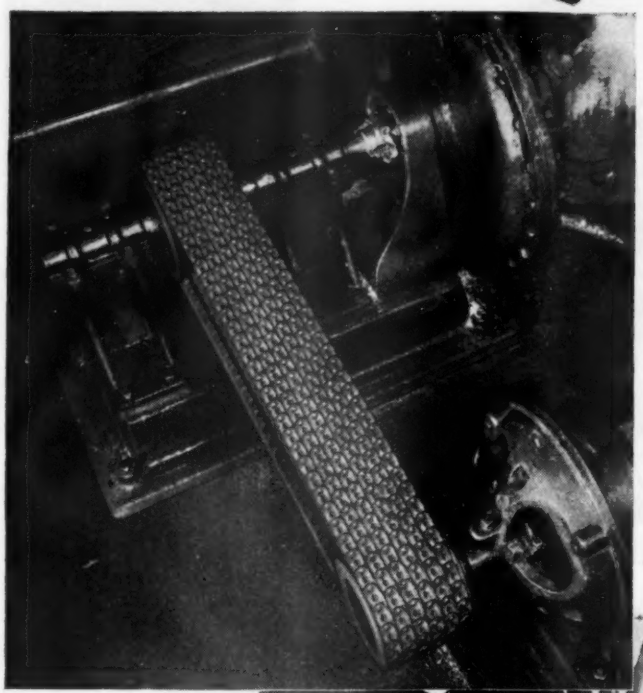
Pumps, Generators and Compressors *Stay* on the Job with Dependable VEELOS

THE ADJUSTABLE V-BELT

Veelos—the adjustable V-belt—promotes continuous operation of large compressors and generators as well as small . . . of pumps in all capacities. It's the adjustable link construction of Veelos that helps these important units to stay on the job . . . cuts installation and repair downtime to practically zero. Consider these Veelos advantages:

1. Veelos is Easy to Install: Any desired length of belt can be uncoupled from an economical stock roll of Veelos and installed on any drive in a few minutes.

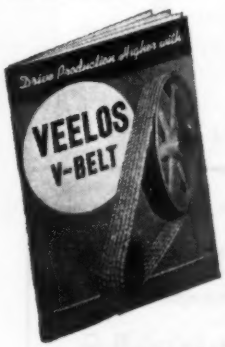
2. Veelos is Easy to Adjust: Belts can be adjusted to maintain uniform tension simply by removing links.



12-strand Veelos V-belt driving 250 HP compressor.

6-strand Veelos V-belt operating 20 HP pump.

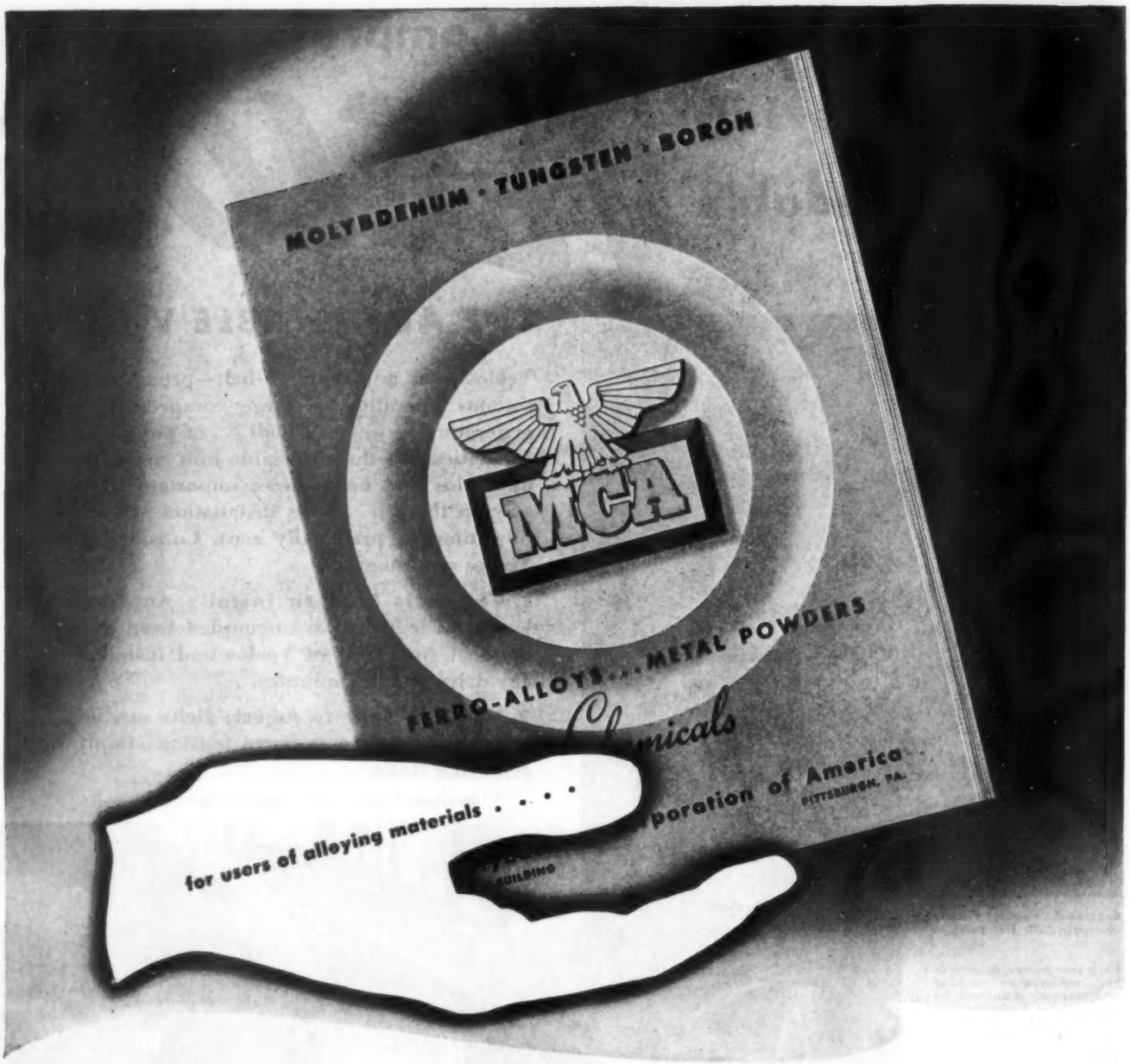
Keep your pumps, generators and compressors running without costly shutdowns for belt servicing. Learn the facts about Veelos from *free 8-page illustrated manual* giving applications, construction detail, installation directions and engineering data.



MANHEIM MANUFACTURING & BELTING CO.
MANHEIM, PENNSYLVANIA

VEELOS
THE LINK
V-BELT
ADJUSTABLE TO ANY LENGTH
ADAPTABLE TO ANY DRIVE

LINK CONSTRUCTION UPS PRODUCTION



the Molybdenum Corporation offers you

a new catalog

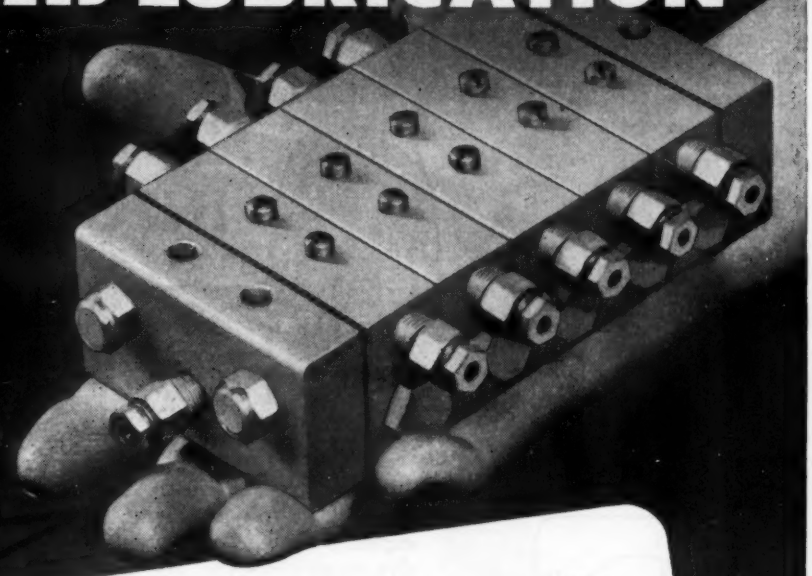
Molybdenum, Tungsten, and Boron, in their industrially useful and available forms, and chemical compounds of these elements, are the subjects treated of in the new catalog of the Molybdenum Corporation. Users or potential users of such products are likely to find the book of interest. Write for your copy.

AMERICAN Production, American Distribution, American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.
Works: Washington, Pa.; York, Pa.
Mines: Questa, N. M.; Yucca, Ariz.; Urad, Colo.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

Trabon

TYPE M POSITIVE CENTRALIZED LUBRICATION



Offers these outstanding advantages

1 **It's Unbelievably Inexpensive**—every machine builder can afford to have it—no machine user can afford to be without it.

2 **Easy to Understand—Easy to Install**—requires a minimum of tubing—parts—and installation.

3 **Lubricates Every Bearing**—whether large or small, moving or stationary, easy or difficult to reach.

4 **Minimizes Flexible Hoses**—permits all the bearings on a moving machine member to be lubricated with just one flexible hose.

5 **Manual or Automatic Operation**—using a hand pressure gun... a manually operated pump... or an automatic pump, preferred by most users, because it reduces the human factor to simply keeping the pump reservoir filled.

6 **Get Your Post-War Improvements—Today**—Send for Bulletin No. 442. It gives full details.

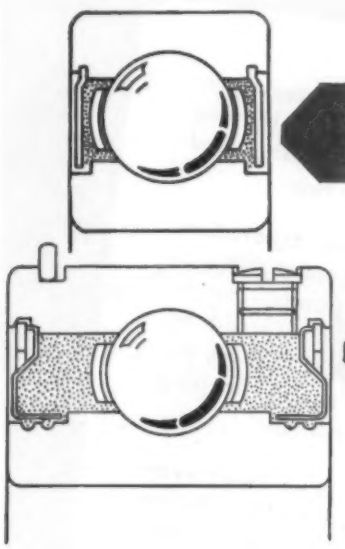
TRABON

ENGINEERING CORPORATION

1819 East 40th Street, Cleveland 3, Ohio • Industrial Lubrication Exclusively Since 1922

ORIGINATORS AND PATENT OWNERS OF THE SINGLE LINE REVERSING LUBRICATING SYSTEM

YOU CAN'T GET A QUART INTO A PINT MEASURE



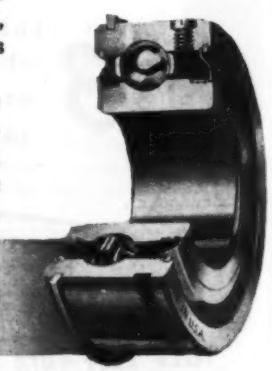
And, "by the same token," you can't get as much grease into a single-row-width "sealed" ball bearing, as goes into the double-row-width "CARTRIDGE" BALL BEARING of equal bore and outside diameter. Look at the section drawings herewith, and you'll see why.

In the single-row-width shielded or "sealed" bearing, see that very small grease space inside the sealing plates. Note further that there is no space available for a highly-efficient, truly grease-tight seal.

Now, in contrast, see that big grease reservoir between the seals, in the "CARTRIDGE" BEARING section—providing at least DOUBLE THE GREASE CAPACITY of the shielded or "sealed" bearing, and greatly extending the greasing intervals. Note, too, how the wide, inwardly-extending seal flanges, and the oil grooves on the inner ring, provide AN IDEAL SEAL THAT PREVENTS THE ESCAPE OF GREASE AND EXCLUDES DIRT, whatever the shaft angle.

Furthermore, the "CARTRIDGE" SEALS ARE REMOVABLE AND REPLACEABLE, should you wish to inspect the bearing or change the grease. And the refilling plug makes it easy to put in a new charge of grease. You can't do this, with the ordinary shielded or "sealed" bearing, which is permanently sealed.

QUALITY, too, is just as vital as QUANTITY, in the grease in your bearings. So, every "CARTRIDGE" BEARING leaves our factory, abundantly packed with NORMA "STABILITY-TESTED" GREASE, which has great resistance to oxidation as well as excellent lubricating properties.



NORMA-HOFFMANN

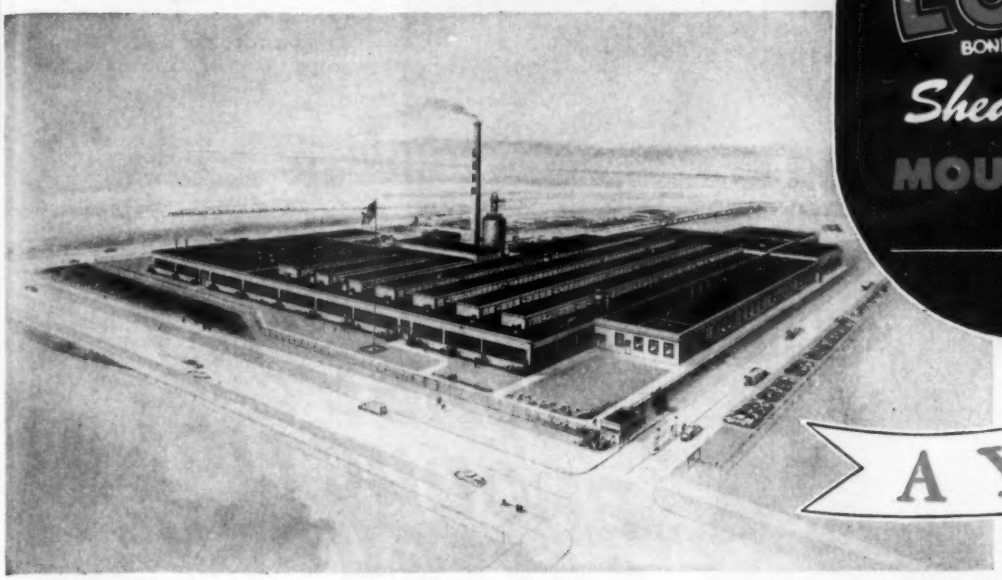
"CARTRIDGE"
BALL BEARING

Summing up . . . all these distinctive features of the NORMA-HOFFMANN "CARTRIDGE" BALL BEARING mean prolonged bearing life, less lubrication attention and lower maintenance cost. Write for the Catalog, enumerating many additional advantages. Let our engineers work with you.

NORMA-HOFFMANN BEARINGS CORP'N, STAMFORD, CONN. • FOUNDED 1911

TO WIN THE WAR: *Work—Fight—Buy War Savings Bonds!*

MILLIONS OF



LORD
BONDED RUBBER
Shear Type
MOUNTINGS

A YEAR

"LORD MOUNTS", as they are generally known, are being produced at the rate of many millions per year. A large proportion of this production is of *synthetic rubber*, which has proved in the main, to be as effective as natural rubber in flexible mounts for Vibration Control.

The entire facilities of the Lord factory are used to produce mountings and other bonded rubber products, and the energies of the research, development, and field engineering staffs, are devoted exclusively to the improvement of these products for industrial and military use. By specializing, Lord is producing mountings that are the criterion in the flexible suspension field.

The method of bonding rubber to metal, which Lord has developed, permits the use of the rubber in such manner that the stress is always in shear, thus providing the proper deflection for a given load. The final result is a mounting system which provides the greatest efficiency in vibration isolation.

Lord Mountings are small, compact, lightweight units, easy to install and load ratings range in small increments from a few ounces to several thousand pounds. They prolong equipment life, lower maintenance costs, insure greater accuracy of operation, reduce material weights by eliminating the necessity for inertia masses, increase personnel efficiency by eliminating nerve-wearing noise and vibration transmitted through solid conduction.

Send for literature on vibration control or call in a Lord Vibration Engineer for consultation on vibration problems. There is no obligation.

IT TAKES RUBBER *In Shear* TO ABSORB VIBRATION

LORD MANUFACTURING COMPANY
ERIE, PENNSYLVANIA

SALES REPRESENTATIVES
NEW YORK - - 280 MADISON AVE.
CHICAGO - 520 N. MICHIGAN AVE.
DETROIT - - 7310 WOODWARD AVE.
BURBANK, CAL. - 245 E. OLIVE AVE.
CANADIAN REPRESENTATIVES
RAILWAY & POWER ENGINEERING CORP., LTD.
TORONTO, CANADA

Originators of Shear Type Bonded Rubber Mountings

Do More Than Before—
Buy EXTRA War Bonds

AT SPERRY—
This De Laval Oil Purifier is part of the cutting oil reclamation system at the Lake Success plant of the Sperry Gyroscope Company, Incorporated.

★ *Profitable SALVAGE and a PRODUCTION SAFEGUARD..*

DE LAVAL CUTTING OIL PURIFICATION

★ Purification of cutting oil by De Laval Centrifugal Oil Purifiers is a salvage and maintenance operation that pays especially well, for it restores the cutting oil to usable condition, enabling it to be used again and again. Even more important than the savings in oil that De Laval Purifiers effect, however, are the actual production advantages of having available a plentiful supply of cutting oil maintained absolutely free of metallic impurities. They include longer tool life . . . higher permissible cutting speeds . . . and minimized wear on moving parts of machine tools.

Purification of cutting oil is only one of the functions to which De Laval machines are adapted in metal-working plants. The De Laval "Hermetic" Clarifier, for example, which removes harmful abrasives and metallic sediment from grinding coolant, enables the coolant to be used continuously without impairment of its effectiveness, and likewise enables wheels to retain their fast cutting action longer. Moreover, production between wheel dressings is increased and the quality of finishes is improved.

There are many others, equally profitable. Write for Bulletin MM-1 and investigate for yourself.

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 6 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 19

THE DE LAVAL COMPANY, Limited
MONTREAL PETERBOROUGH WINNIPEG VANCOUVER

DE LAVAL PURIFIERS *and* CLARIFIERS FOR FACTORY OILS

FOR GREATER OPERATING EFFICIENCY

Blue-print machine powered by a Holtzer-Cabot motor

Motor "Job Analysis" provides smooth, compact power

Experience proves that by giving advance consideration to such operating factors as torque, load cycles, starting load, reversibility, acceleration, quietness . . . then building a motor that meets the exact performance conditions . . . machines operate more efficiently and economically with less maintenance.

Since standard off-the-shelf motors cannot meet all performance requirements, the solution is a special motor . . . designed and built by Holtzer-Cabot.

For over 50 years Holtzer-Cabot has concentrated its energies in designing and building special motors to meet special operating conditions.

Today, our plant facilities are being utilized for manufacturing special fractional H.P. motors for war products, but our motor development engineers will gladly discuss your post-war fractional H.P. motor problems and requirements with you.

SPECIAL MOTORS DESIGNED TO FIT THE APPLICATION

HOLTZER-CABOT

Division of First Industrial Corporation

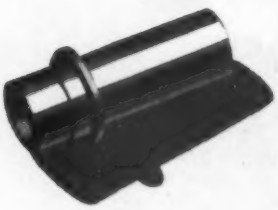
Designers and Builders of Special Fractional HP Motors and Electrical Apparatus

125 AMORY STREET, BOSTON 19, MASS. • NEW YORK, N. Y. • CHICAGO, ILL. • PHILADELPHIA, PA.

JOHNSON BRONZE

SLEEVE TYPE BEARINGS

Flanged Bearings



to your Specifications

Ledaloyl . . . powdered bronze is ideal for making flanged bearings. It eliminates all costly machining . . . provides self-lubrication.

● Designers of equipment and machinery often find that the addition of a flange to an otherwise plain sleeve bearing not only solves the problem of end thrust but likewise simplifies the task of correctly locating the bearing in assembly.

Johnson Bronze can supply flanged bearings of any type . . . in any size . . . to your most exacting specifications. This includes flanges on one end or both ends . . . in the center or off-center . . . made from cast bronze—in any alloy . . . bronze and babbitt . . . steel and babbitt . . . or *Ledaloyl,* powdered bronze.

The easiest, most satisfactory method of determining whether you can use flanged bearings to advantage is to call in a Johnson Engineer. Permit him to review your applications . . . to study the operating conditions. He will base his recommendation on facts, free from prejudice. There is one located as near as your phone . . . Why not consult with him—TODAY?

DISTRICT SALES OFFICES: Atlanta · Boston · Buffalo · Chicago · Cincinnati · Cleveland · Dallas Detroit · Kansas City · Los Angeles · Minneapolis · Newark · New Castle · New York · Philadelphia Pittsburgh · St. Louis · San Francisco · Seattle

JOHNSON BRONZE

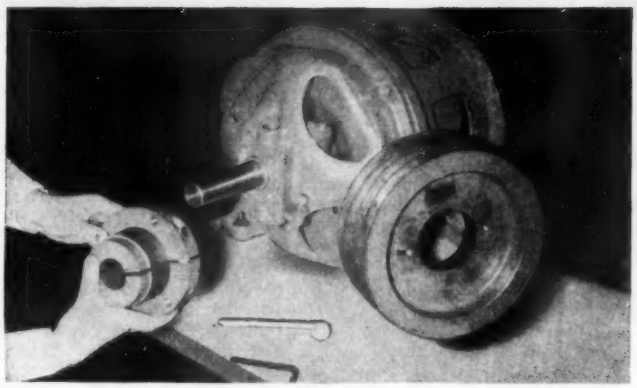
SLEEVE BEARING HEADQUARTERS

The MOST COMPLETE SLEEVE BEARING SERVICE in the WORLD

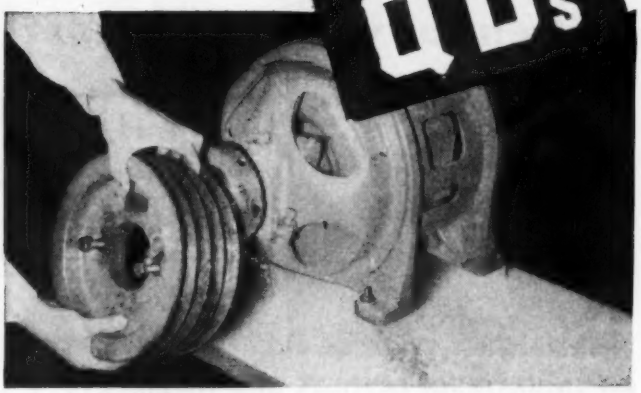
515 S. MILL STREET NEW CASTLE, PA.

DO YOU HAVE THESE 3 FEATURES IN YOUR PRESENT SHEAVES?

If so, they must be WORTHINGTON'S QDs



1. EASY TO GET ON



2. EASY TO GET OFF

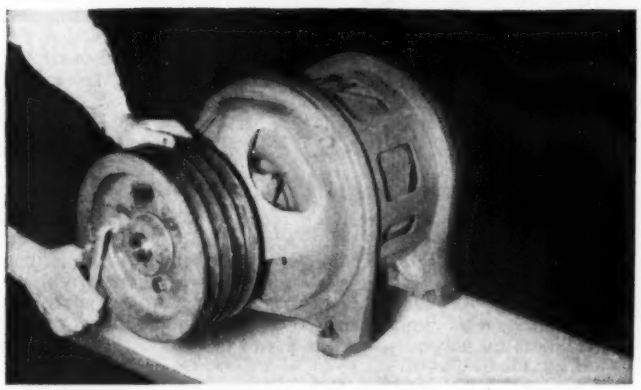
Are you losing time with old-fashioned sheaves? You may be, if you haven't got the QD's time-saving *three* features.

1. Split hub — with taper cone surface for mounting taper bored rim — makes *installation easy*.

2. Pull-up screws usable as jack bolts break Taper Friction Fit, quickly free shaft for bearing maintenance, speed changes, or *quick removal* and mounting of different diameter rims . . . without disturbing the hub. No alignment problems.

3. Bigger pull-up bolts for higher taper cone pressure insure positive clamp grip, keep sheave *always tight on the shaft*.

The sheave with these 3 features, teamed up with Worthington Goodyear Endless Cord V-Belts will give you more for your money. Stock size sheaves and belts at strategic centers from coast to coast.



3. YET ALWAYS TIGHT ON THE SHAFT

Reading Time: 3 Minutes — To Get Accurate Belt Ratings

From the 72-page Master Manual, containing original engineering data . . . sectionalized, loose-leaf, tabbed for ready reference . . . you can select in three minutes the right Worthington V-Belt drive. You get accurate belt ratings . . . avoiding *over*-belting and *under*-belting. Send the coupon today for your free copy! Specification and installation record sheets included.

Centrifugal, Rotary, Steam & Power Pumps | Vertical & Horizontal Compressors | Liquid Meters | Variable Speed Drives | Multi-V-Drives

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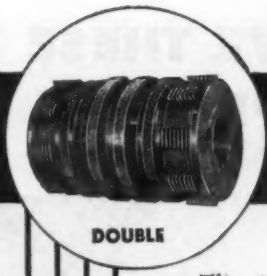

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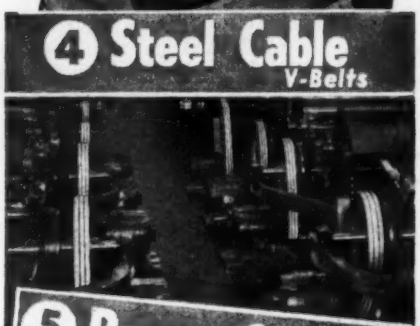

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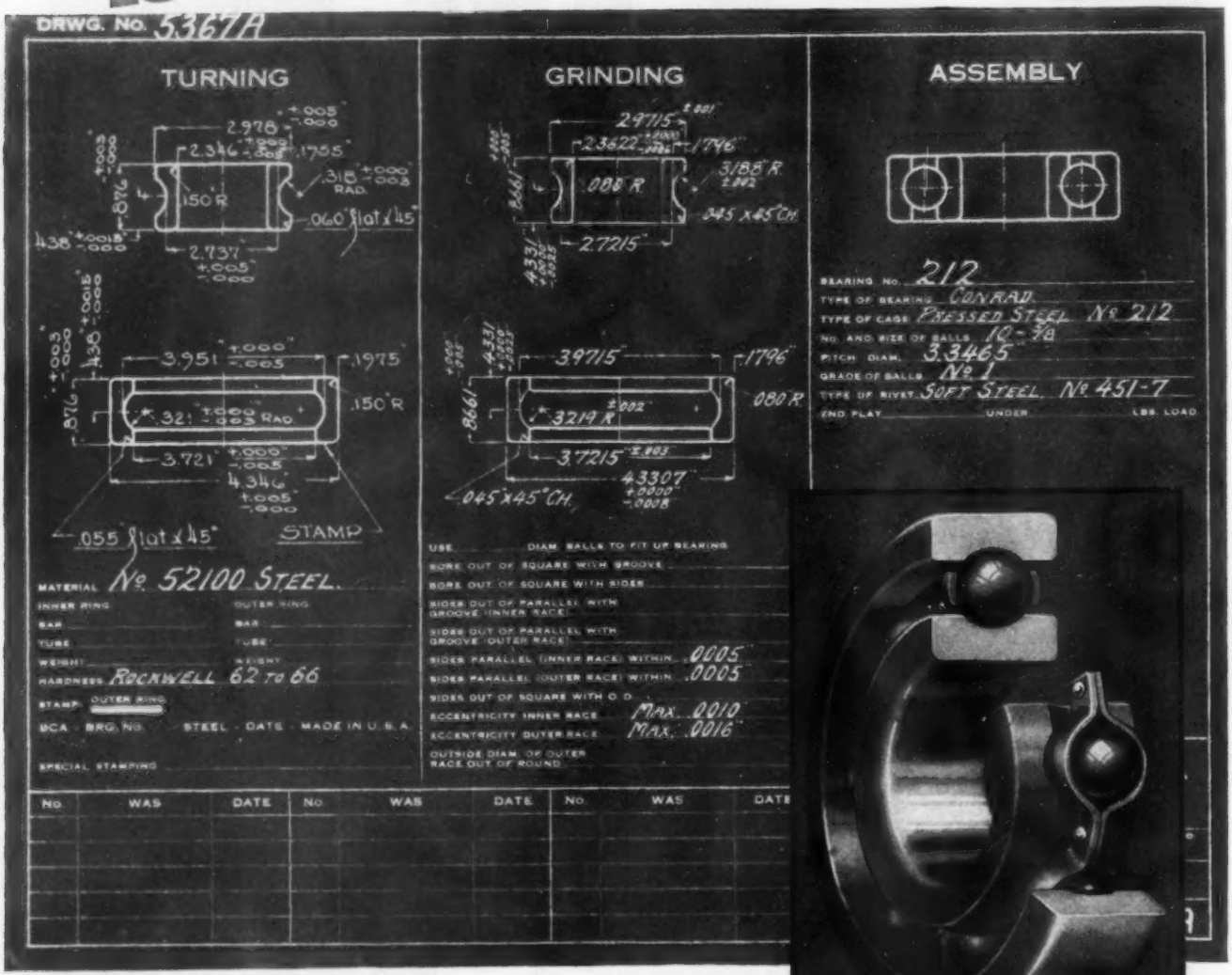

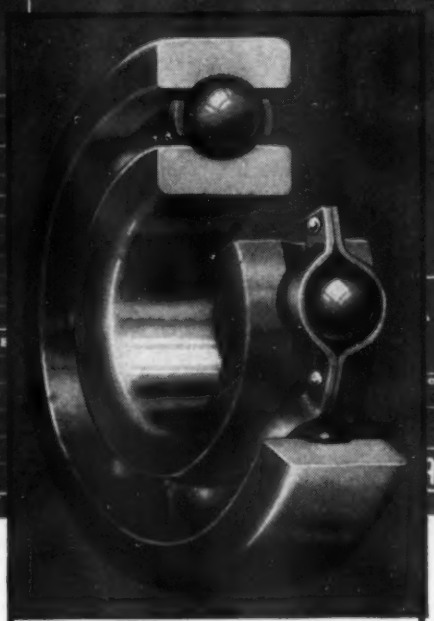

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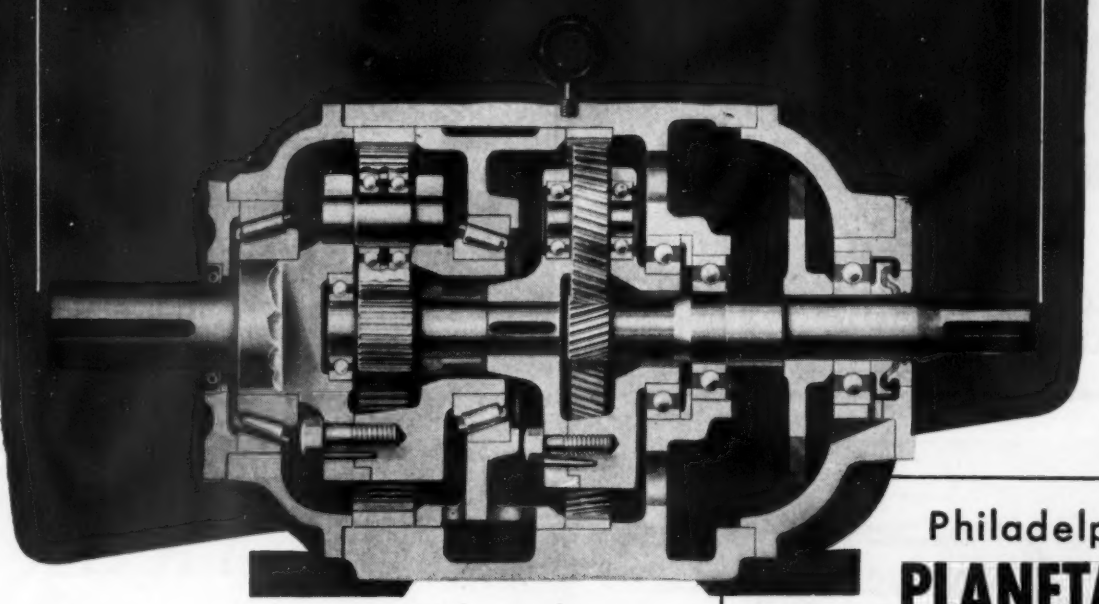

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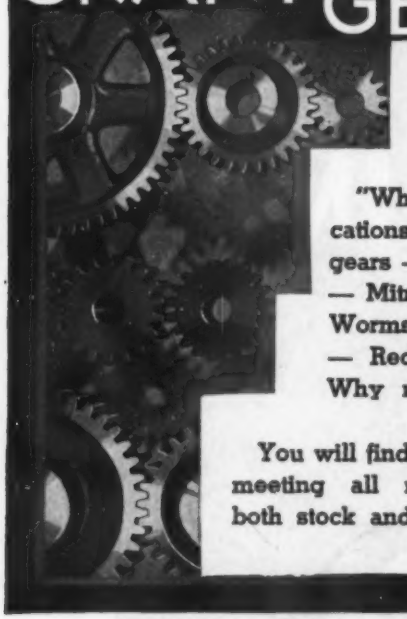

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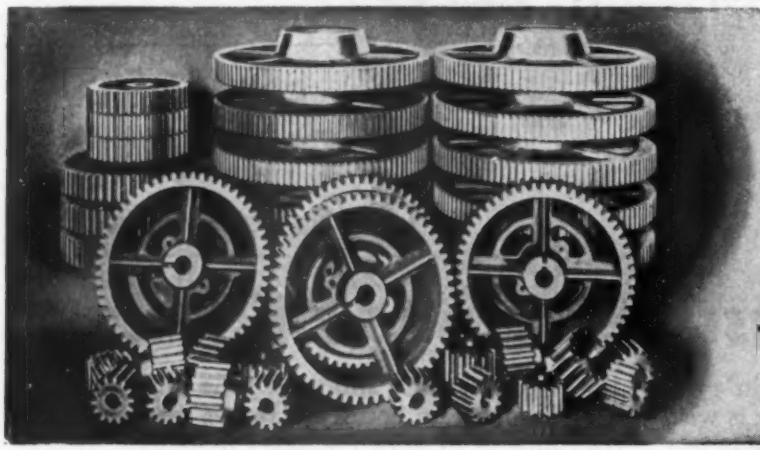

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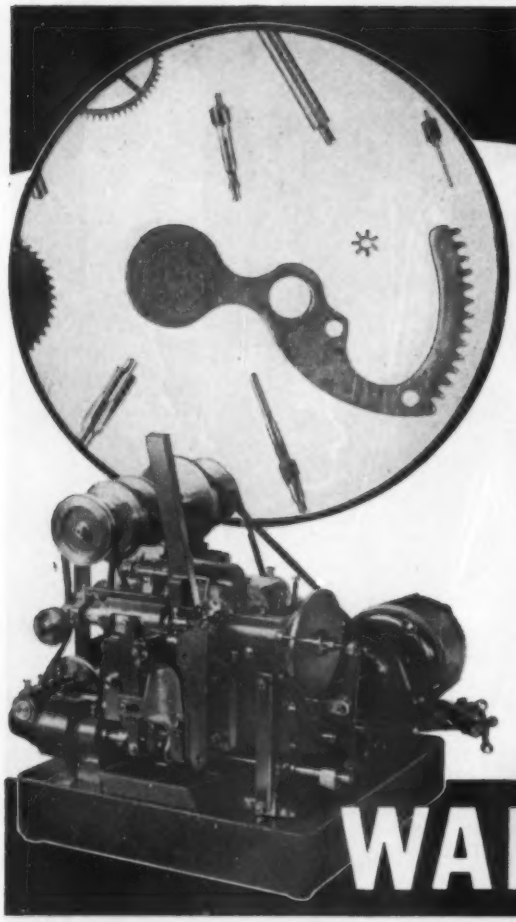

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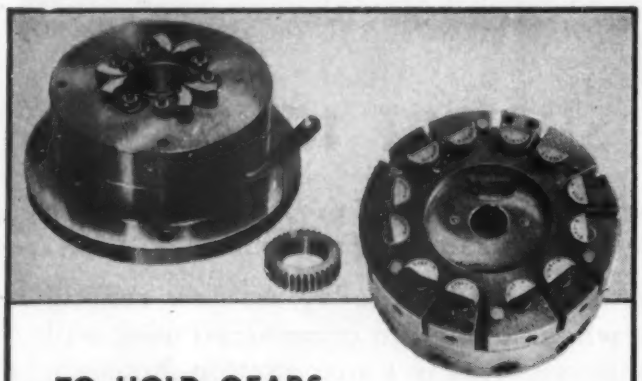

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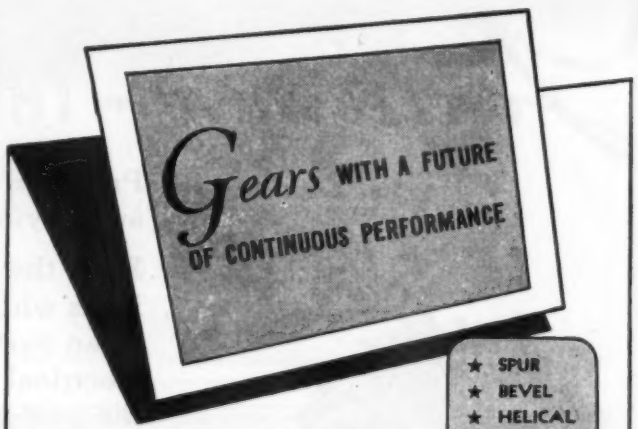

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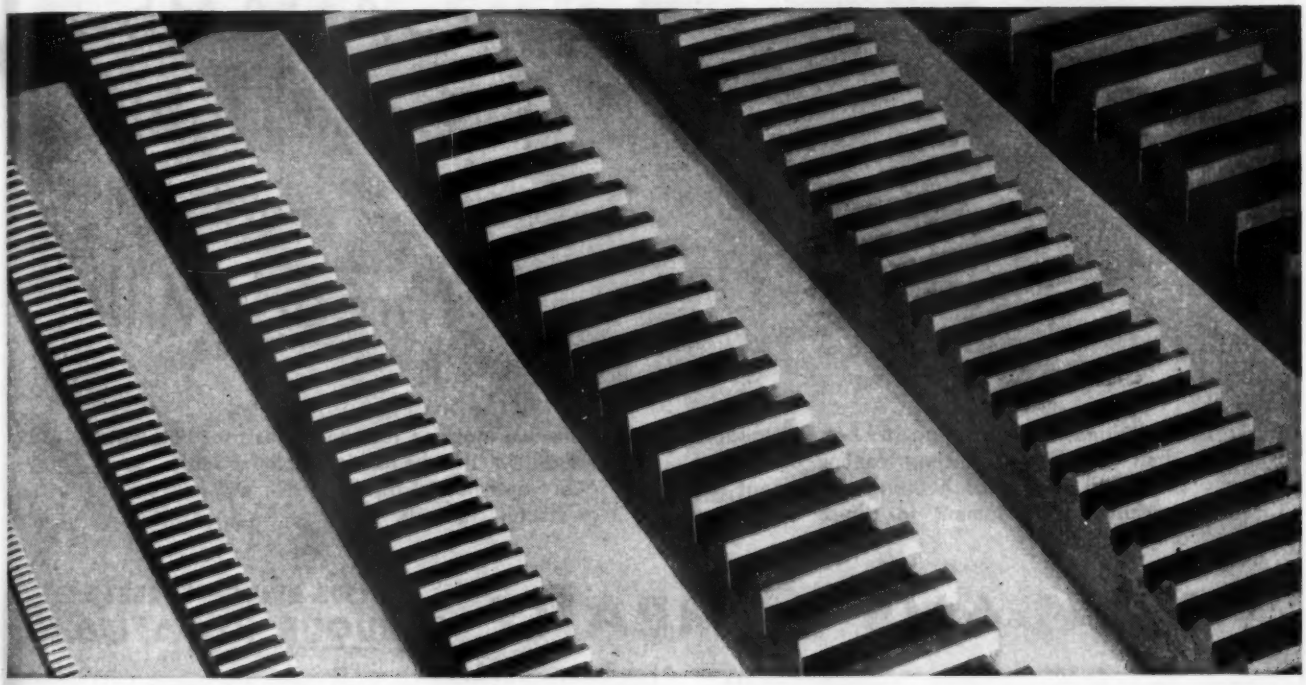

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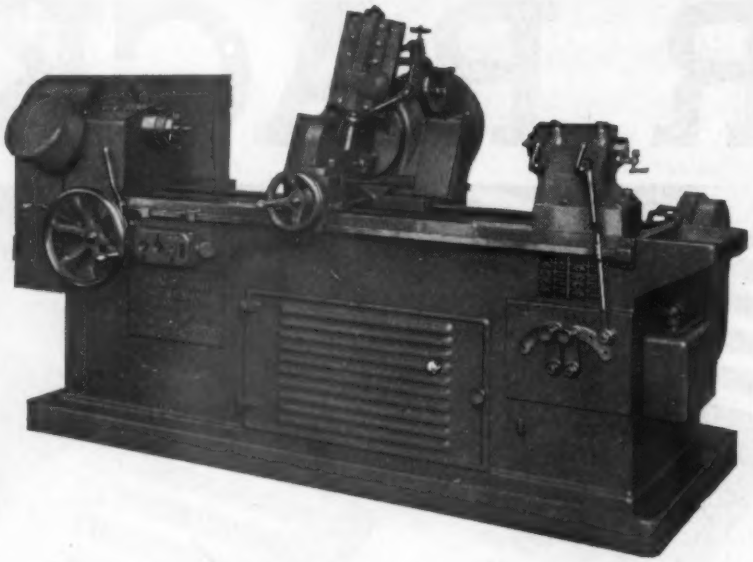

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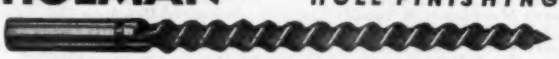

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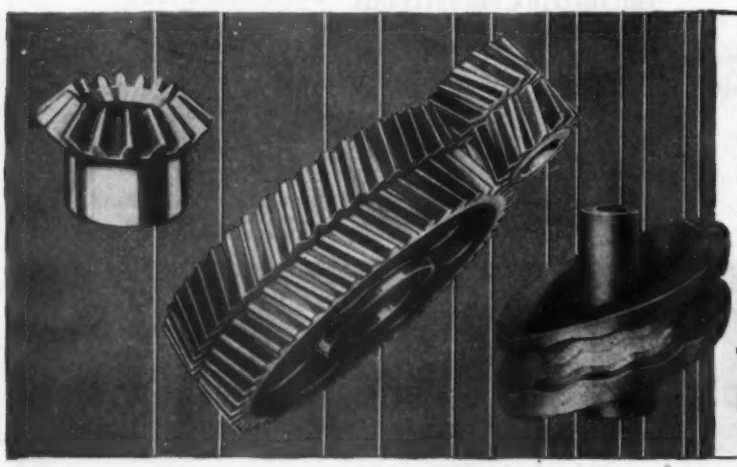

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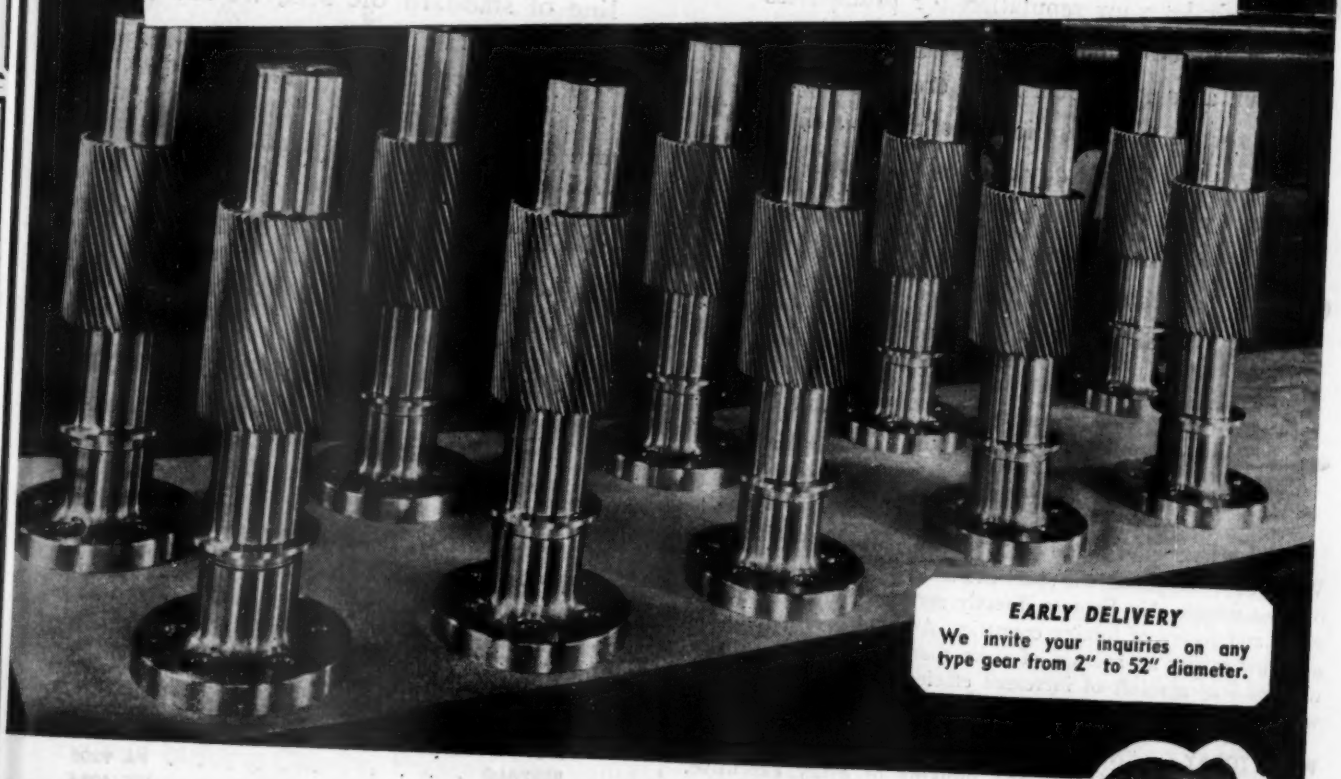

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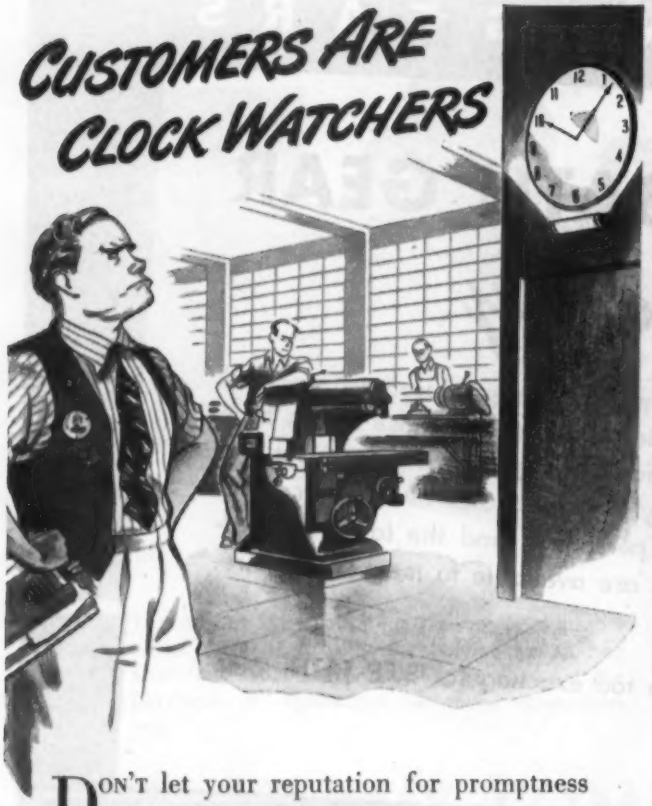

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CLEARING HYDROPNEUMATIC DIE CUSHIONS Make Presses MORE VERSATILE

Type FH Hydropneumatic Cushion

This schematic illustration reveals how the piston works against liquid instead of air in the Clearing Type FH Cushion. The liquid is admitted into the cushion by a check valve. During the drawing stroke the piston presses down on the liquid forcing it back into the container through an air-actuated relief valve. The air valve makes it possible to maintain an even drawing pressure at all times throughout the drawing stroke. Air-operated relief and check valve works automatically; all the press operator need do is set the relief valve for the required drawing pressure.

In these Clearing Cushions, hydraulic pressure cylinder and compressed air reservoir are combined in a single unit. Designed to accommodate high pressure, the Type FH handles high and low pressures equally well.

The cushion often eliminates enlarging press pits and foundations when equipping existing presses for heavier jobs. It is also the solution to occasional metal drawing problems where peculiar die design or other considerations make air-operated blankholders undesirable because of high pressure requirements.

Clearing Hydropneumatic Die Cushions bring you greater capacity per cubic foot of space required than do ordinary cushions. Installation of these Clearing Cushions often permits production of a wider variety of work on existing equipment. Their compact design makes it possible to install Clearing Hydropneumatic Die Cushions where a press bed or foundation does not permit installation of ordinary air cushions.

Hydropneumatic Die Cushions are typical products of the skill and knowledge of press problems gained by our organization in designing and building Clearing Presses. The value of this approach to the production of press accessories is evident in the details above that describe these cushions.

It will pay you to know all about Clearing Cushions and what they can do for your particular operations. When inquiring about Hydropneumatic Die Cushions, please include press manufacturer's name, model number, capacity and stroke; dimensions of bed opening and bed area. Write us today for complete and interesting information on cushions built by press builders. Clearing Machine Corporation, 6499 West 65th Street, Chicago 38, Illinois.

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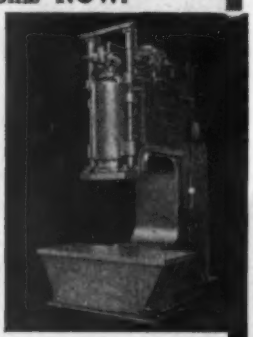
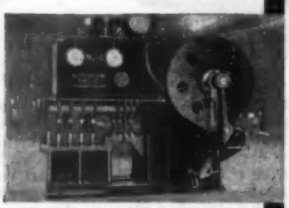
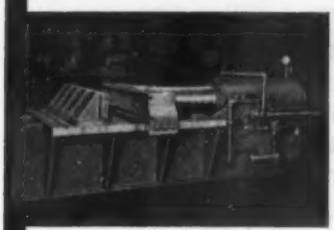


BEATTY Hydraulic Gap Type Press; self-contained. 15-, 75-, 200-, 250- and 350-ton capacities.

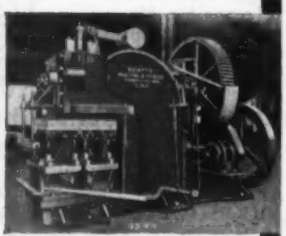
BEATTY Heavy Duty Hydraulic Press of closed housing type. Capacities to 750 tons.



BEATTY Toggle type Beam and structural Punch with double gagged unit.



BEATTY Hydraulic Bulldozer. Rugged, modern design in 35- through 200-ton capacities.



BEATTY Heavy Duty Mechanical Punch — Note ram size for use with table.

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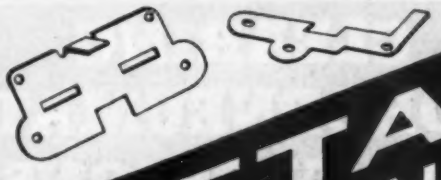

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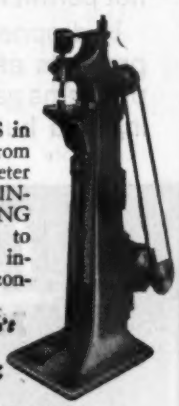

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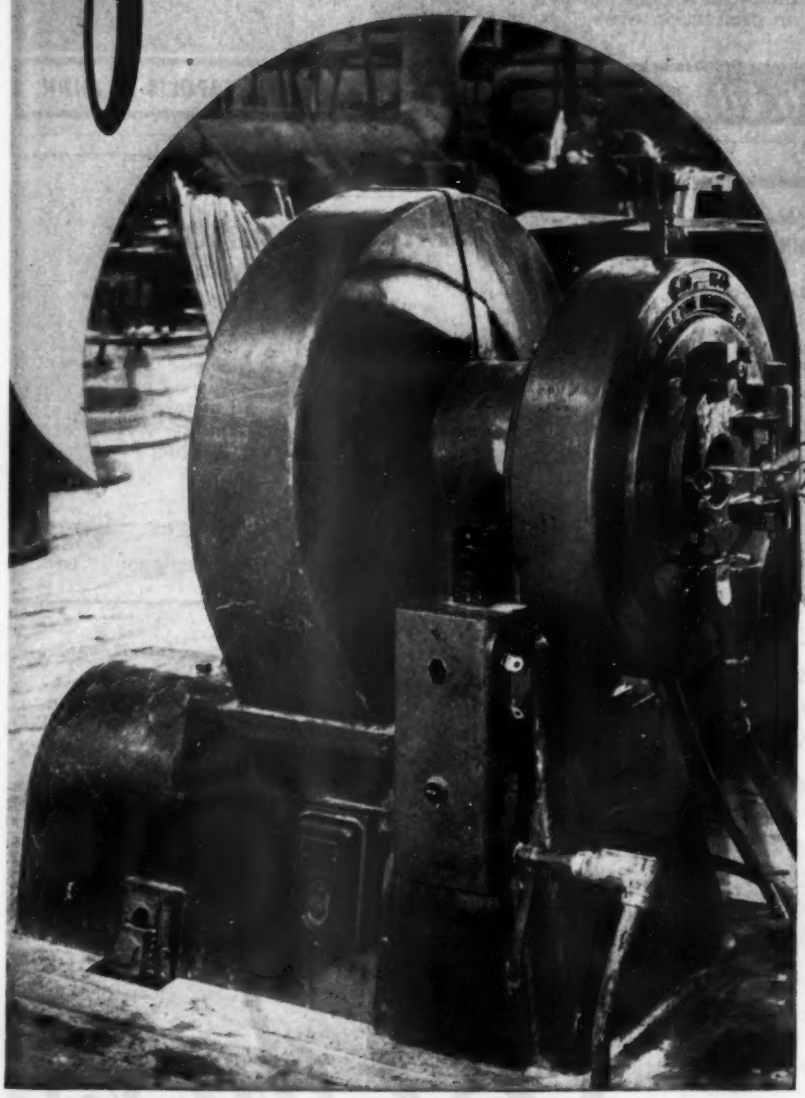

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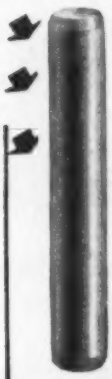

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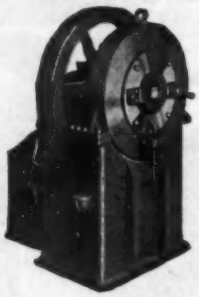

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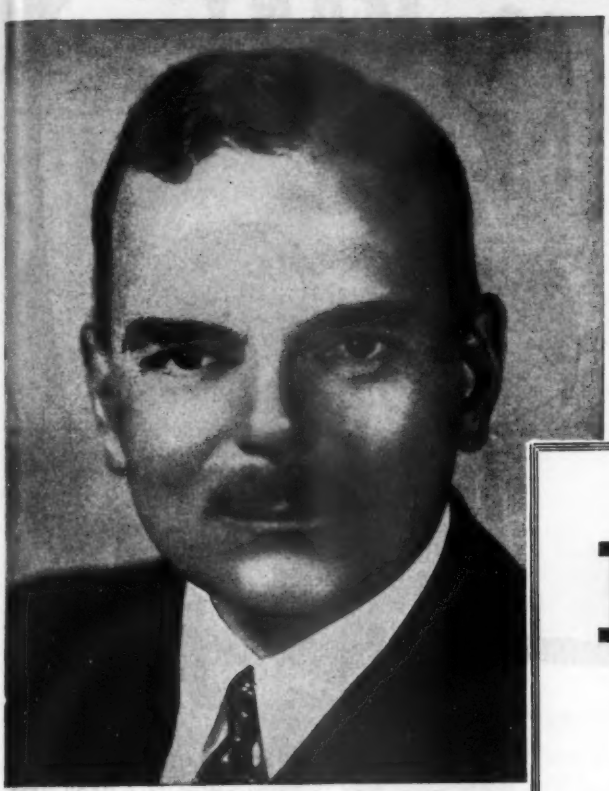

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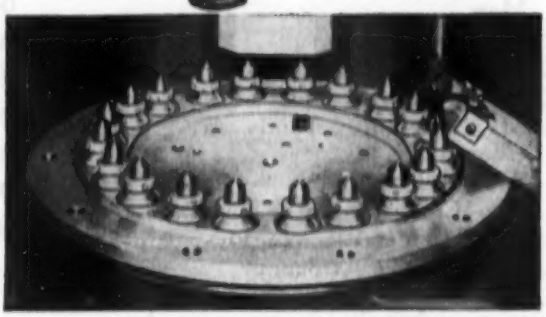

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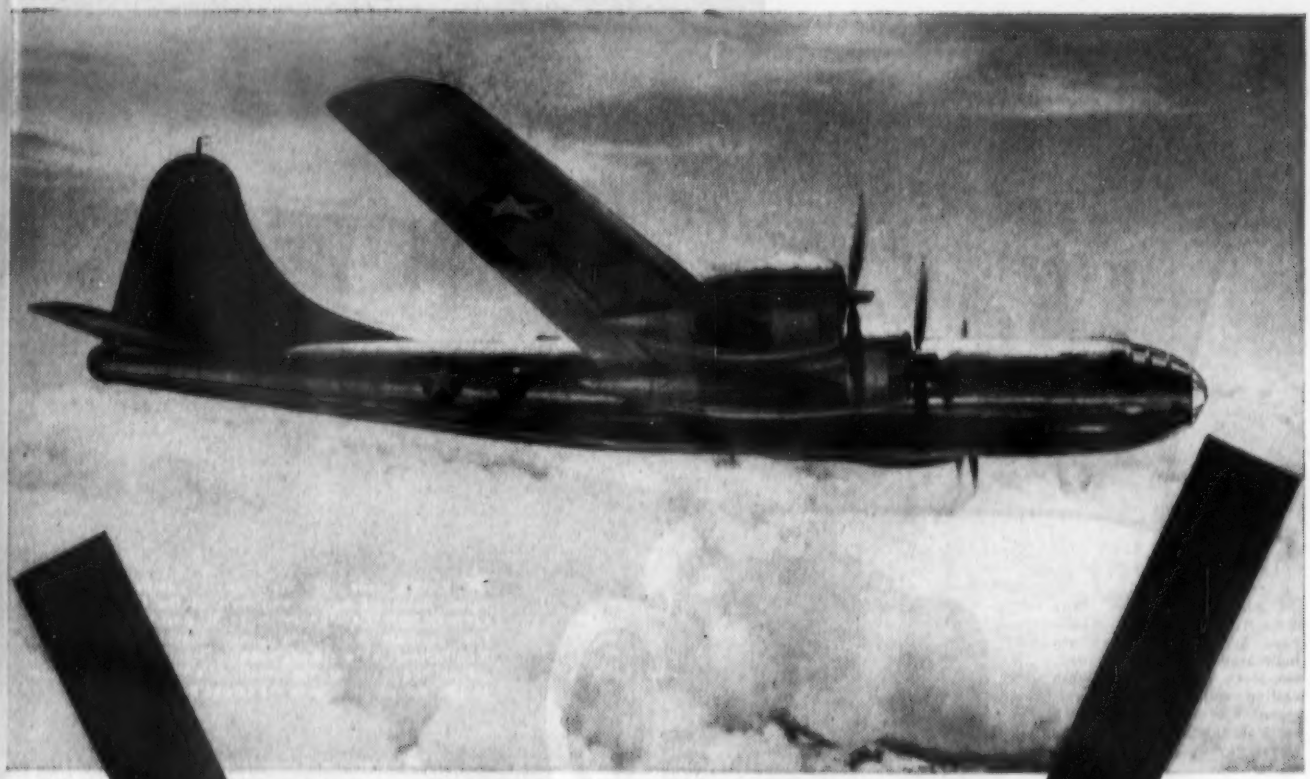

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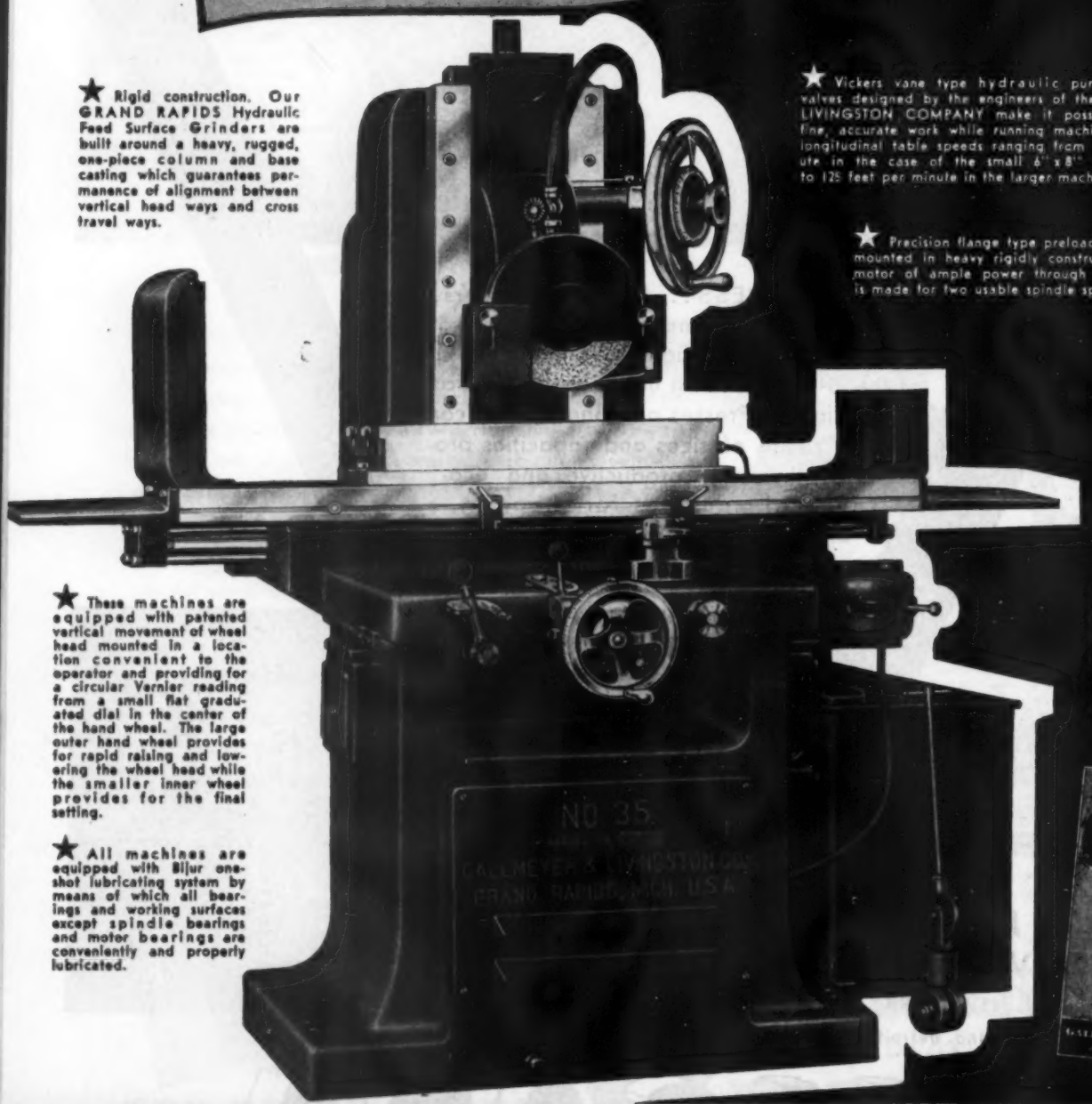
★ Precision flange type preloaded ball bearing spindle mounted in heavy rigidly constructed head is driven by motor of ample power through vee-belts and provision is made for two usable spindle speeds.



★ These machines are equipped with patented vertical movement of wheel head mounted in a location convenient to the operator and providing for a circular Vernier reading from a small flat graduated dial in the center of the hand wheel. The large outer hand wheel provides for rapid raising and lowering the wheel head while the smaller inner wheel provides for the final setting.

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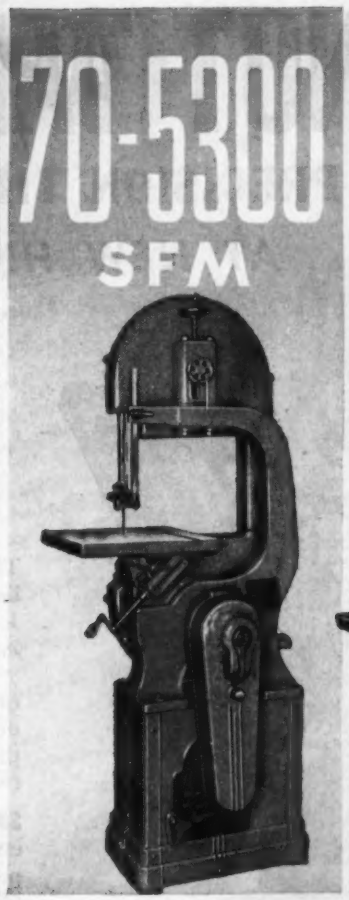

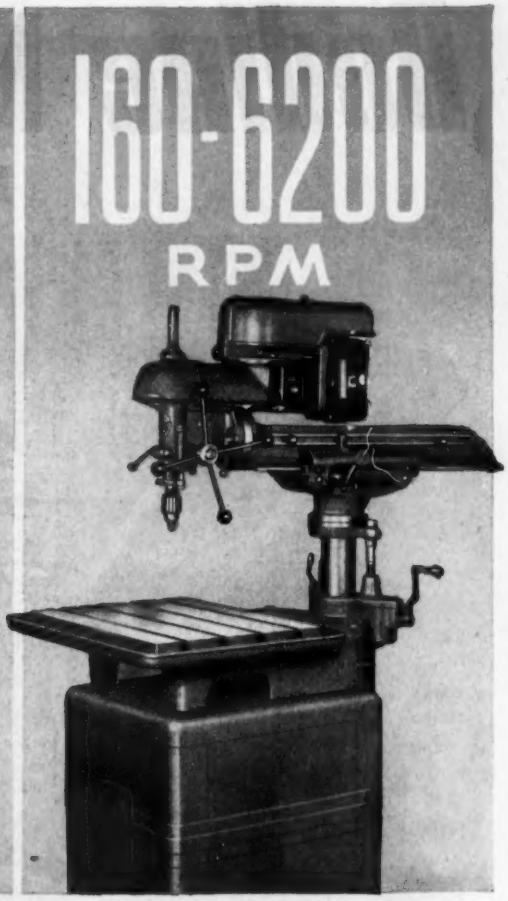

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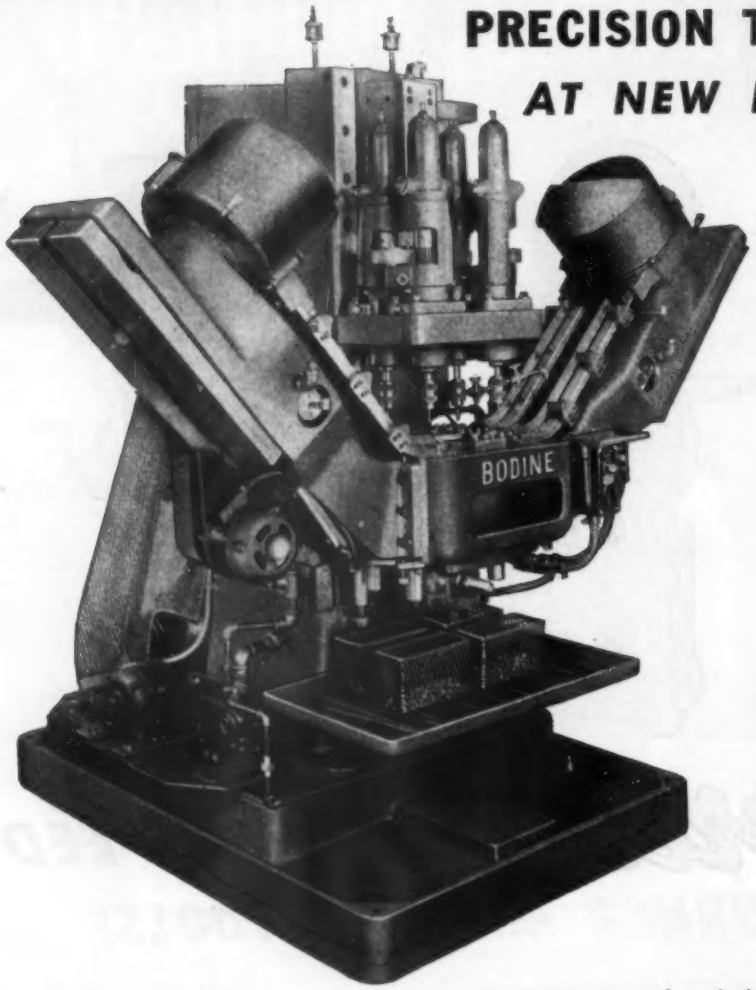
Bodine NUT TAPPING with PRECISION THREADS (Class 3-4-5) AT NEW HIGH Speed



The Bodine No. 48 Nut Tapping machine has been designed to accomplish two things . . . 1. to produce precision threaded nuts faster . . . 2. to employ unskilled operators.

The precision threading is assured by the use of 4 lead screw controlled spindles which produce 4 nuts simultaneously, at each stroke of the machine . . . the blanks being fed from two double-chute oscillating hoppers.

SPEED. Production speed is naturally dependent on many factors such as tap size, threads per inch, nut thickness, material and cutting speed allowable, coolant used, etc. Bodine recommends a maximum operating speed of 45 strokes per minute . . . which totals 9000 nuts per 50 minute hour. This is fast production and includes any nut blanks that can be hopper fed up to ½" — 13 T.P.I. in mild steel or its equivalent.

INSPECTION. Because the tapped nut from each spindle is collected in its individual basket, it is a simple matter to gauge the product of each tap at any stage of operations.

SAFETY. Electrical interlocks prevent the starting of any motor in wrong sequence . . . nor can taps operate until the nut blank is in proper position on its working plate. Such automatic protection saves rejects, and prevents harm to taps, the machine and the operator.

LEAD SCREW PRECISION CONTROL. All four spindles with their individual lead screws are operated as one by a single segmental gear drive which starts the tap slowly, then reverses at double the tapping speed. The threads on the master screw and its spring-tensioned nut match those of the tap. These control screws and nuts are changed to match changes in tap pitch.

ADDED ADVANTAGES

1. Two sizes of nuts can be fed at one time . . . each hopper feeding 2 blanks of a size.

2. If production of Commercial threads is desired (Classes 1 and 2), lead screw control is *not* required. Bodine will convert spindles to spring-compensated type.

3. Even though the machine is streamlined for good appearance and to prevent damaging dust collection, the design is not at the expense of easy maintenance. All important parts and controls are easily accessible.

4. A conveniently located vari-speed unit permits instant speed changes by the turn of a handle.

NEW BULLETIN NOW AVAILABLE

We have just produced an 8-page bulletin which pictures and describes the complete story of the Bodine No. 48 machine. Included are detailed drawings, engineering data and specification tables. You will want to investigate this valuable machine. *Send for your copy today.*

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AUTOMATIC DIAL TYPE DRILLING, MILLING, TAPPING AND SCREW INSERTING MACHINES

INDUSTRY POLL POINTS TO PLAN-O-MILL!

Here's how **PLAN-O-MILL** *measures up to Industry's demand*

The Bramson Publishing Company's
PRODUCTION POLL
of the Metal-Working Industry

• Staff editors of this publication believe the answers to these questions may guide readers toward an enlightened outlook on postwar mass production. Answers gathered from the field, from the more than 20,000 readers of this magazine and at its PRODUCTION Round Tables each month, will undoubtedly reflect the thinking of the metal-working industry in the U. S. and Canada.

QUESTION	Per Cent Replying YES	NO
1. Do you envision greater precision in postwar manufacturing?	50%	50%
2. Where advisable, will you replace pre-war equipment with war-built or D P C equipment?	70%	30%
3. Are changes in machine tools indicated to fully utilize improvements in cutting tools?	100%	—
4. As a general rule, should machinery controls be changed so as to provide greater motion economy on the part of operators?	100%	—
5. Do you favor electronic controls?	93%	7%
6. Are lubrication systems on machine tools today efficient, adequate and accessible?	3%	97%
7. Do you see a trend toward a reduction in stock removal for finish, by such means as precision forming, casting, forging, stretching etc.?	94%	6%

inadequate. The ... of color PRODUCTION Round Table poi...

July 1944—*Tool Engineer.*

1 Plan-O-Mill does a precision job at a production rate.

3 Plan-O-Mill is up to the minute in efficient use of cutting tools, either high speed steel or carbide.

4 Plan-O-Mill is electrically controlled—one push button for complete cycle.

5 Plan-O-Mill was the first planetary to install electronic feed and speed controls.

6 The answer is "YES" for Plan-O-Mill.

5 PLAN-O-MILL *Firsts*

- First to install General Electric's remarkable new Thy-mo-trol electronic feed control!
- First planetary to mill external threads with standard multiple thread cutter!
- First planetary to coordinate feeds and speeds!
- First to provide absolute control of feed-in!
- First to offer a practical, low cost carbide thread milling cutter!

If your war or postwar products involve internal or external threading, or cylindrical forming, now is the time to replace obsolete, wasteful machines with Plan-O-Mill. Contact your machinery dealer or write direct.

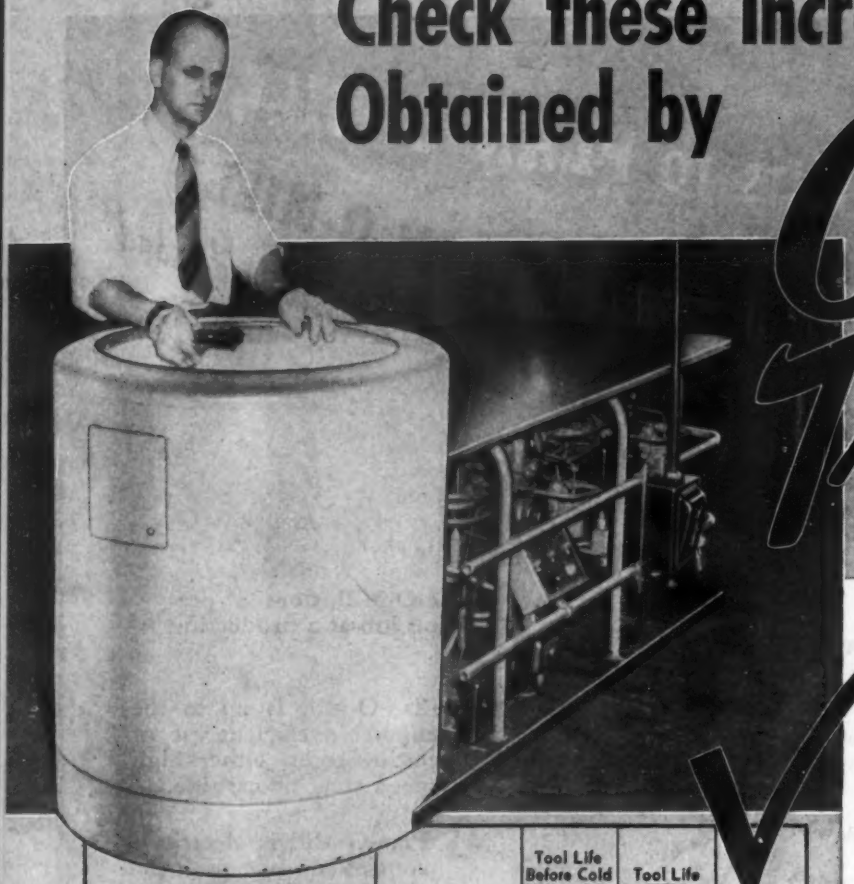
THREAD AND FORM PLAN-O-MILL MILLING MACHINES

PLAN-O-MILL CORPORATION

1511 E. EIGHT MILE ROAD • HAZEL PARK, MICHIGAN

THREAD AND FORM PLAN-ED MILLING CUTTERS

Check these Increases in Tool Life Obtained by *Cold Treating* in a Deepfreeze Industrial Chilling Machine



Operation	Tool	Tool Life Before Cold Treatment (Number of pieces machined per grind)	Tool Life After Deepfreeze Cold Treatment	Increase
Milling foot pads on chrome moly steel motor mound	4½" end mill	40	84	110%
Drilling 338 holes in aluminum airplane fin	No. 29 drill No. 21 drill ⅛" drill No. 41 drill	112 54 82 144	280 108 164 288	150% 100% 100% 100%
Drilling 16 holes in chrome moly steel motor mound	No. 45 drill	8	50	525%
Drilling 12 holes in chrome moly steel side plates of motor mound	Combination 23/64" drill and ⅜" reamer	60	140	133%
Drilling 2 stainless steel parts	F drill	200	300	50%
Drilling holes in buck board for gun turret	No. 30 drill	10	32	220%
Average Increase in Tool Life on 6 Typical Jobs in This Plant...				165%

Manufacturer Averages 165% Increase on Six Typical Jobs...

The increased tool life obtainable by means of Deepfreeze cold treatment is being demonstrated every day in actual, practical applications like these six typical jobs from a large Mid-West manufacturer.

When tools were subjected to sub-zero temperatures in a Deepfreeze Cascade −120° Industrial Chilling Machine an average increase of 165% was recorded, based on the number of pieces it was possible to machine before resharpening the tool. Equal or longer life was obtained from subsequent grinding in most cases.

The cold treating procedure employed at this plant is as follows:

1—Heat part to approximately 300° F.
2—Allow to return to room temperature (approximately 100° F.).
3—Chill for 2 to 6 hours at minus 120° F. in a Deepfreeze Cascade −120° F. machine ⅔ full of methylene chloride convection fluid.
4—Allow to return to room temperature.
Repeat cycle six times.

Deepfreeze industrial chilling units make equally profitable results possible in every factory, job shop and heat treating plant. The process is easy and economical to use—results are positive.

In addition, Deepfreeze sub-zero equipment is being used effectively for shrink-fit assembly, stabilizing of gauge blocks and lapping flats, instrument testing at low temperatures, and other industrial work.

Put this valuable process to work in your plant. Learn what it is doing for others—and what it can profitably do for you. Write for this new 40-page booklet of actual performance data, applications and latest procedure.

Get these *Free* Additional Facts...

Cold treating is a comparatively new science, and has developed tremendously in recent months. All the latest authentic information on how and where to use sub-zero temperatures is contained in *"Cold Treating Practice"*—a 40-page illustrated booklet that will be sent upon request. Ask for Bulletin No. 1-4.

Only Motor Products can make a "DEEPFREEZE"

Deepfreeze

2327 DAVIS STREET
NORTH CHICAGO, ILLINOIS

TRADE MARK DEEPFREEZE REGISTERED UNITED STATES PATENT OFFICE

Industrial Chilling Equipment for Shrinking, Testing, Hardening and Stabilizing Metals

Division of Motor Products Corporation, Detroit, Michigan

This PART (as shown) MADE IN ONE OPERATION

WITH THIS STRAIGHT TOOLING

ON A MODEL A 2½"

CLEVELAND AUTOMATIC

A "production headache" solved by use of the right equipment . . . made from Dural hex bar stock, with multiple I.D. and O.D., matching thread and tolerances held to .003, total indicator reading. First position (after gauge stop) center rough drilling and rough turning front O.D., with both tools mounted on the same station: Front body O.D. then finish-formed with front cross-slide: Next position rough drilling smallest I.D. Back O.D. finish-formed in one stage with rear cross-slide: I.D. then finished with counterbore (tolerance here +.002 −.000). Tapping done on last station and part delivered by the independent cut-off. Production rapid for this type of work.

THE CLEVELAND AUTOMATIC MACHINE COMPANY

CLEVELAND 3, OHIO

Remember: CLEVELANDS CUT COSTS

Ask for Cleveland Bulletin on Automatic Production Equipment

SALES OFFICES

CHICAGO (6): 1408 Civic Opera Bldg. DETROIT (2): 540 New Center Bldg. CINCINNATI (12): 4932 Beech St.
NEWARK (4): 902 American Insurance Bldg. HARTFORD (1): 529 Capitol National Bank Bldg.

L.W. CHUCK CO.
L-W LATHE CHUCKS
L-W LATHE CHUCKS
Hardened steel jaws, accurately ground, have wide gripping surface. Body is semi-steel, heavily ribbed, and will stand up under unusual strain. Steel thrust bearings are provided to assure durability.
10" Size $33.45
12" Size $38.30
14" Size $43.45
16" Size $55.60
18" Size $73.60
Three-jaw Universal chucks are available in 6¼" ($45.00), 7½" ($55.00), and 10½" ($75.00) sizes.
L.W. CHUCK CO.

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products

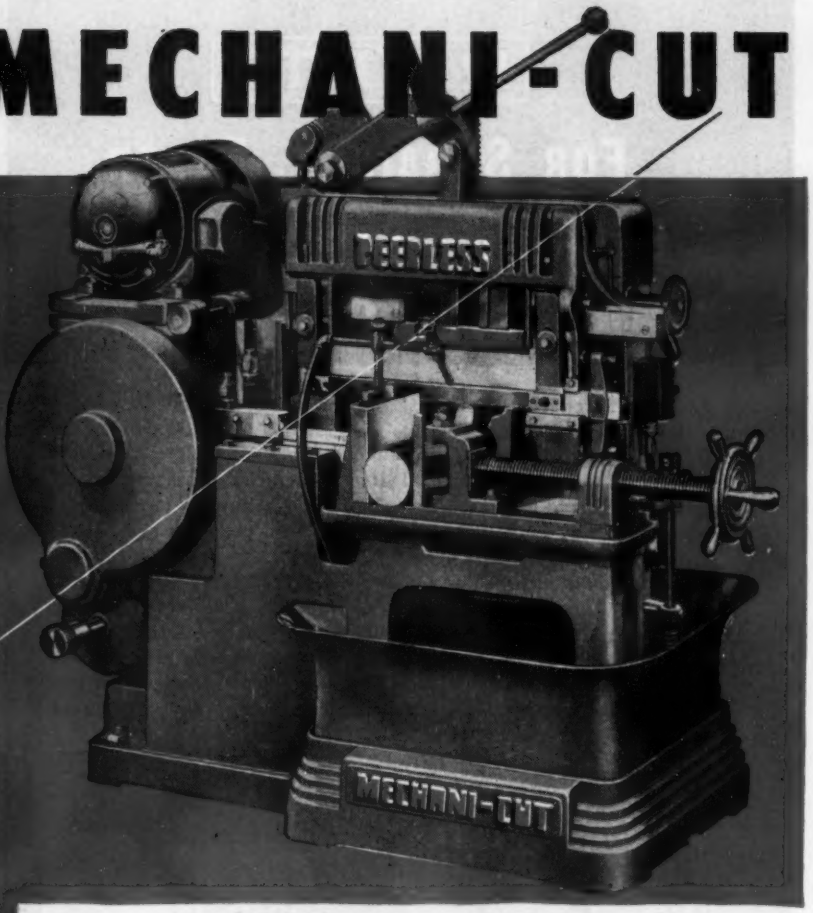
L-W CHUCK COMPANY

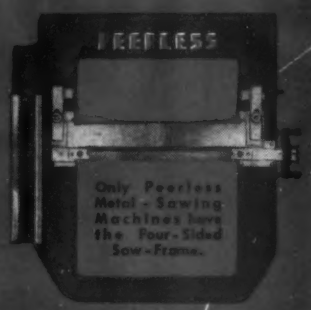
5 N. ST. CLAIR ST.
TOLEDO 4, OHIO

The NEW MECHANI-CUT

PEERLESS Leads Again

Production Superintendents want a FAST, ACCURATE-CUTTING Power Saw — a Saw that offers the simplicity of full mechanical drive — and PEERLESS meets that need with the new MECHANI-CUT!





THE MASSIVE FOUR-SIDED SAW-FRAME permits locating bearings above and below the Saw Blade. Hardened and ground inserts take all the strain and wear as the Saw-Frame reciprocates in the large guide bearings. Inserts are readily renewable to maintain high cutting accuracy. Locked 1/32" above the blade, the Backing-Plate adds rigidity and permits maximum blade pressures without undue injury to the blade. Three cutting speeds are delivered through the heavy, long-life transmission. All gears are precision-cut.

THE COMPENSATING FEED UNIT is mounted away from falling chips and coolant spray. Pressures to the fraction of a pound are selected by the fingertip control. The highly sensitive rack and pinion feed compensates for hard spots in the metal, condition of the blade, and varying shapes, sizes and types of stock.

The MECHANI-CUT is built part by part, and assembly on assembly, to last with minimum attention. It has the famous Peerless Patented Four-Sided Saw-Frame with Backing-Plate Blade-Support. The Saw-Frame fully surrounds the blade and the work, as illustrated. Check *all* the desirable features. See how capacities of 7" x 7" — 11" x 11" — and 14" x 14" meet the widest range of metal-sawing needs. Not only will the MECHANI-CUT help you wind up existing contract work but it will tie right into your own postwar tooling plans. A manually-operated conveyor can be added right on the job. All the good news is contained in a colorful, new bulletin — MC-51. A note on the coupon will reserve your copy.

PEERLESS
MACHINE COMPANY
RACINE · WISCONSIN

Dept. AM-944

☐ RUSH MY COPY OF BULLETIN MC-51.
Also send bulletins checked.
☐ Peerless Vertical Saw for Die Block Work
☐ Hydra-Cut High Production Saws
☐ Utility and Maintenance Saws

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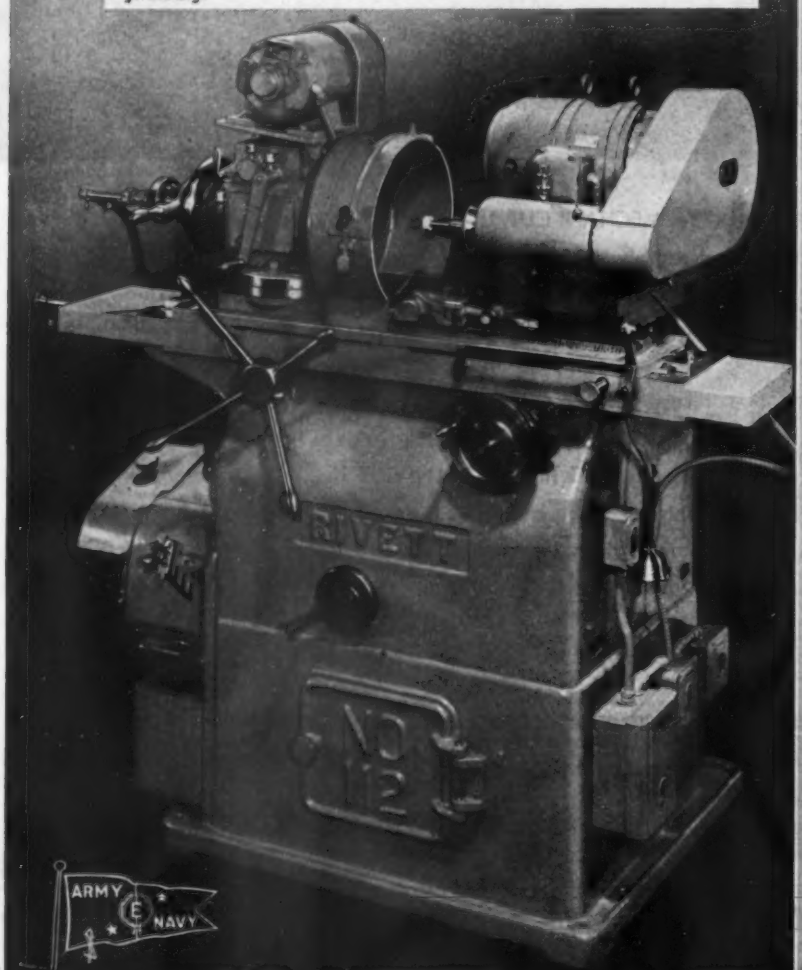
City..... State.....

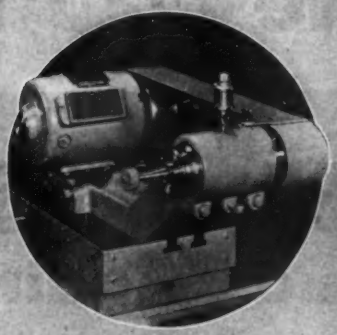
RIVETT

FOR STRAIGHT, TAPER, BEVEL OR STRAIGHT AND BEVEL GRINDING

The Rivett No. 112 Universal Precision Grinder is primarily for tool-room work. Available internal and external spindles in combination with many adjustments make possible a great variety of grinding operations. Extreme simplicity of design enables any mechanic familiar with grinding to operate the machine.

Work may be held in collet, step chuck, jaw chuck or fixture and driven at required speed. Power table reciprocation may be set at one of eighteen selective speeds, from 10 to 86 passes per minute. Length of table travel is infinitely adjustable between ½" and 8". High or low speed internal bracket or external spindle bracket, all as illustrated, may interchangeably be mounted as required on cross slide. Workhead, table and cross slide are swivelled individually or in combination for taper and bevel grinding.





High Speed Internal Spindle

External Spindle and Tailstock

SPECIFICATIONS

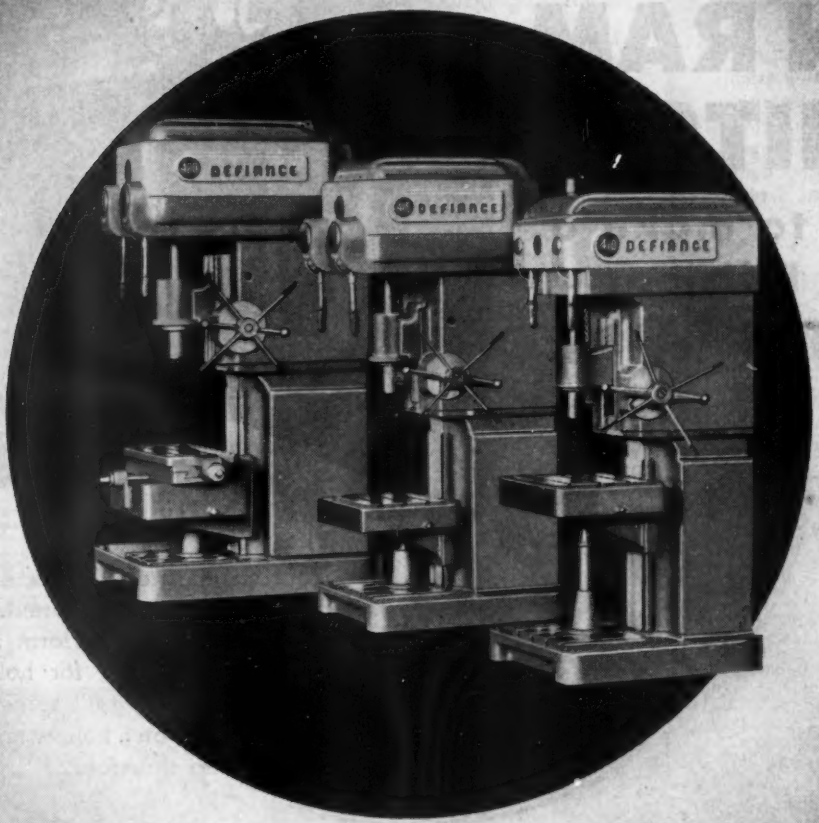
Grinding cap., hole dia.	⅛" to 8"
Grinding cap., outside dia.	up to 8"
Automatic table travel	½" to 8"
Table speeds	18 selective
Hand table travel	16"
Swing over table	14"
Workhead swivel	90°
Table swivel	5°
Cross slide swivel	90°
Cross feed graduations	.0005"
Travel of cross slide	3½"
Collet capacity	1"
Step chuck capacity	8"
Jaw chuck capacity	8"
Workhead spindle speeds	150, 380, 600 r.p.m.
Grinding spindle speeds:	
Standard int.	4600 and 10000 r.p.m.
High speed int.	25000 r.p.m.
External	3300 r.p.m.
Automatic Oil Lubrication	
Net weight with motors	3700 lbs.

For Further Description Write for Bulletin 112

RIVETT LATHE & GRINDER INC.

BRIGHTON, BOSTON, MASS.

QUICK CHANGE DRILLS



● The various models of the Defiance Quick Change Drills are rugged in design and made to meet the requirements of heavy production drilling and boring operations. The machines are of the quick change type with single direct reading levers. One for the selection of feeds, and one for the selection of speeds. Capacities of high speed drill in mild steel range from 1" to 3".

Master mechanics and production men have learned from personal experience that they can depend upon Defiance performance... unbeatable for minimizing expensive down-time and for low-cost, long-life operation. Write for new catalog. Defiance Machine Works, Inc., Defiance, Ohio.

ARMY E NAVY

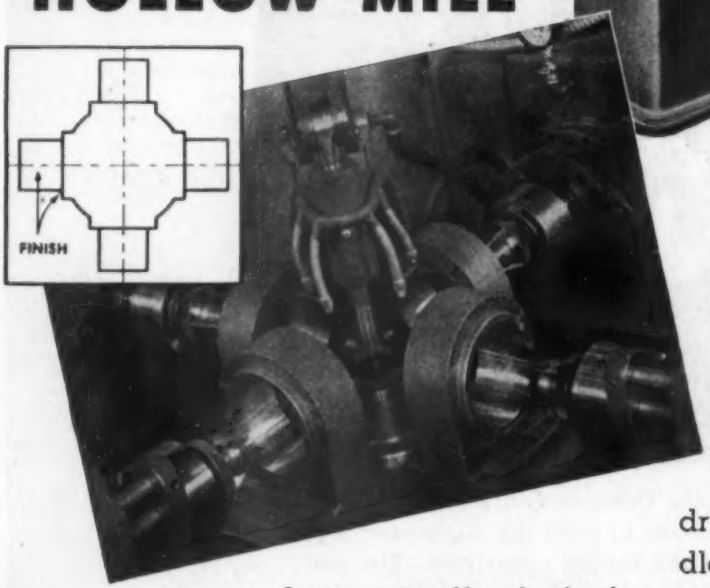
DEFIANCE

BUILDERS OF PRECISION MACHINERY SINCE 1850

ANOTHER APPLICATION THAT DEMONSTRATES THE VERSATILITY OF THE LEMAIRE HYDRAULIC UNITS

Four Standard TWIN RAM UNITS

Combine to make a Highly Efficient HOLLOW MILL



Four standard end bases, each supporting a LeMaire Twin Ram Hydraulic Unit, are bolted to a center base to form a new Four-Way Universal Machine for hollow milling and facing universal joint spiders. By machining these spiders on a hollow mill production was stepped up threefold.

Automatically locked and securely held by air clamps, the piece is approached simultaneously by four spindles operating 90° apart. The outside diameters of the four trunnions are machined and their shoulders faced.

Each spindle revolves in a sleeve held stationary in a bracket, thus eliminating gaulding and possible chip trouble.

This machine can be arranged for boring, drilling, reaming, centering, etc. The spindles can be made to perform different operations all at one time, using an automatic or hand index table in the center.

Does this unusual versatility offered by the Twin Ram Units suggest applications you might make? Can you imagine how economical and practical it would be for you to have these hydraulic units in your plant to increase your scope of operations with minimum equipment? Send to LeMaire Tool and Mfg. Co. for data sheets.

LeMaire

LEMAIRE PRECISION PRODUCTS

BUILDERS OF SINGLE AND MULTIPLE SPINDLE MACHINES FOR BORING, DRILLING, REAMING, TAPPING, ETC.—TWIN RAM HYDRAULIC UNITS —MATCH-IT GEAR CHUCKS.

LE MAIRE TOOL & MFG. CO.
2665 S. TELEGRAPH ROAD
DEARBORN · MICHIGAN

HOW ENGINEERED PRODUCTION WILL GIVE YOU

BETTER MILLING METHODS

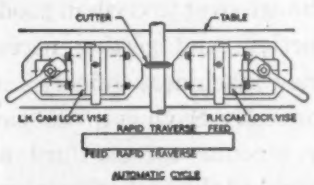
Whatever Your Milling Problem Is, It Can Be Solved Effectively with One of These Three Methods

Experienced and progressive process engineers always strive to solve their metal-working production problems with a minimum of equipment.

The following is a brief resume of the complete engineering and manufacturing service available from Sundstrand to meet all or any of your production milling requirements in small and medium size work.

1 Standard Rigidmils with Fixtures and Tooling to Suit Your Work

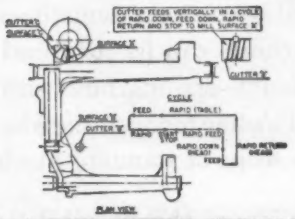
When possible, milling production problems are solved most economically by using standard Rigidmils supplied with standard attachments or simple fixtures and tools to suit the work. When such an arrangement cannot be employed profitably, the next most profitable solution is . . .

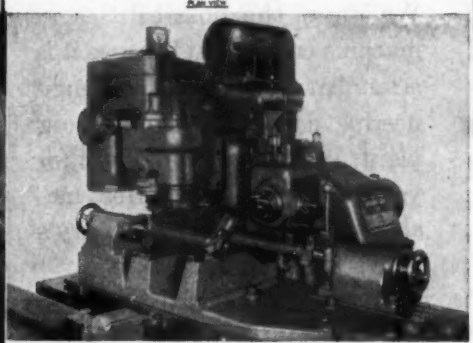


Standard Rigidmil provided with standard work holding vises. Machine is provided with a two-way table cycle, operator merely changes workpiece in vise at end of table opposite from milling, thereby enabling him to perform continuous milling. Production was increased to 175 more pieces per hour over the former hand milling method.

2 Standard Rigidmils with Special Heads and Tooling

All standard Sundstrand Rigidmils are designed to accommodate the application of a wide variety of special heads and tooling. When the requirements of the job at hand cannot be fulfilled with these specially tooled standard Rigidmils, Sundstrand Engineers recommend and design . . .

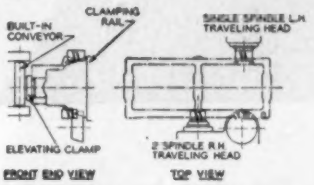


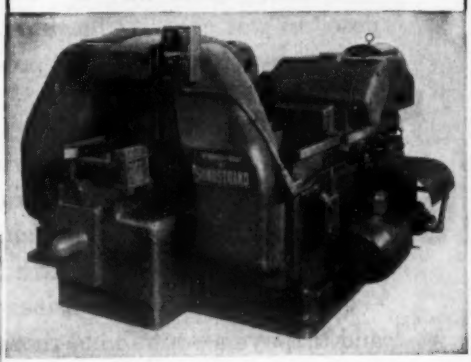


Sundstrand Rigidmil provided with special heads and tooling for milling three different surfaces—two horizontal, and one vertical, in one setting of the part. Adjustment is provided so that machine can handle several sizes of similar parts. Machine utilizes automatic cycle, making it necessary for the operator only to load and unload, and press the cycle start button.

3 Entirely Special Machines

Special machines are designed only when the required production cannot be obtained most economically with either of the foregoing methods. Sundstrand engineers have had wide special machine design experience for all types of metal-working plants . . . on diversified production milling problems in small and medium size work.





This special machine is designed to mill the generator pads, oil distributor pad, fuel pump and number pad of a cast iron cylinder block. Two opposed traveling heads mill the block simultaneously. The operator controls the entire automatic cycle and operation by merely pressing push buttons.

Get These Free Booklets or Call in a Sundstrand Production Engineer

These free booklets cover Sundstrand Standard Milling Machines. Write for them today. Ask for Bulletins 128. If your problem cannot be met with these standard millers, our engineers will be glad to assist in the designing of a special machine to do the job economically. Call on them without obligation.

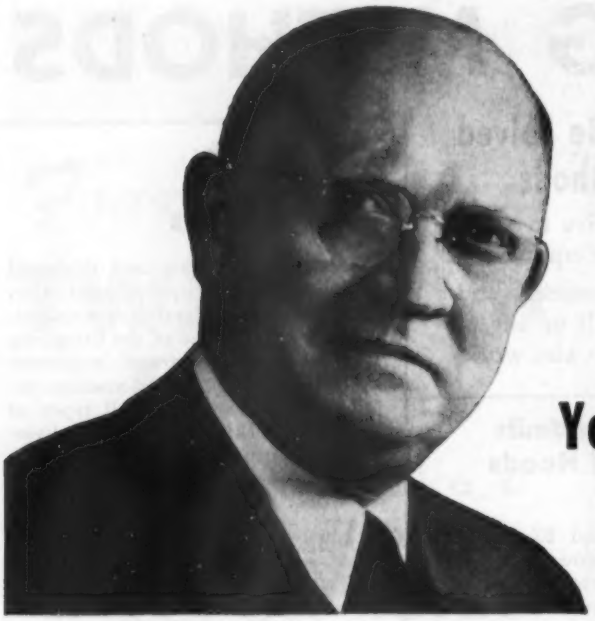
SUNDSTRAND MACHINE TOOL CO. ROCKFORD ILLINOIS U.S.A.

ARMY NAVY

SUNDSTRAND MACHINE TOOL CO.

Rigidmils • Fluid-Screw Rigidmils • Automatic Lathes • Hydraulic Equipment • Drilling and Centering Machines • Special Milling and Turning Machines

2533 ELEVENTH ST., ROCKFORD, ILLINOIS, U. S. A.



What Are You Doing About CONVERTING Your War Contract Machines?

Many war contract machines are convertible to entirely different operations for civilian goods production—at a substantial saving in cost and time.

The most logical way to "dispose" of war contract machines is to convert them to the production of civilian goods.

Not all war contract machines are convertible, of course, but many are, and it is just plain good business for all concerned—government, private business and taxpayers—to rebuild those machines and give them a new life of productive usefulness.

Machines often can be converted to entirely different operations or, by the use of special equipment, their capacity can be built up far beyond the original limits. Through the use of special adapters, machines of different makes can be converted to take identical equipment and perform identical operations. Sometimes two machines can be combined into a double-end machine with special tooling for operations beyond the scope of standard machines.

We know the possibilities in machine conversion because it is a familiar operation in our engineering department and in our plant. We have been doing it for years and have converted machines for many of the country's largest industries.

From that experience, we know that machine conversion is not only entirely practical but that it is also the practical solution to the three-way problem of disposing of government-owned machinery, getting floor-space for the change-over to civilian goods production, and getting necessary new machinery quickly and economically. Savings in cost can easily amount to one-third as compared to the cost of new machines and delivery can be accomplished in weeks instead of months.

We will be glad to discuss the convertibility of your machines if you will write us fully, listing your machines and describing your proposed products and production objectives.

Charles Snyder
PRESIDENT

SNYDER TOOL AND ENGINEERING COMPANY
3400 East Lafayette • Detroit 7, Michigan

YOUNG MAN—IS THIS YOUR POSTWAR OPPORTUNITY?

In preparation for postwar developments we are contemplating the necessary additions to our engineering, drafting and manufacturing staffs.

Our work provides an exceptional opportunity to increase your knowledge and experience and to obtain a thorough course of training under some of the country's most competent engineers and shop men.

If you are one of the younger men who have definite ideas about making some phase of the machine designing and building business your life work, we invite you to write to our Personnel Manager, outlining your experience, ability and aspirations. Your letter will be held in strict confidence.

SNYDER
DESIGNERS AND BUILDERS OF SPECIAL-PURPOSE MACHINES FOR HIGH PRODUCTION AT LOW UNIT COST

20 Years of Successful Co-operation with Leading American Industries

BOOSTING PRODUCTION OF BOOSTER BODIES WITH GREENLEE 6 SPINDLE AUTOMATICS

SCRIPTO MFG. CO. SETS FAST PRODUCTION PACE

Scripto Mfg. Co. — producers of world famous, high quality mechanical pencils for consumers and industrial users — has established a noteworthy record in production expediting with two Greenlee 6-Spindle Screw Machines. Their net machine output of brass boosters, a shell fuse part, set a fast production pace over a 2½ year period. Here is typical production data characteristic of Scripto's efficient methods of operation which has won them the Army-Navy "E" Award:

Month	Scheduled Operating Hours	Net Production Efficiency
April	638	78.0%
August	626	71.5%
September	528	74.6%

NOTE: All time losses for tool adjustments, breakage, mechanical failures, etc. are included. Due to high rate of production, approximately 10% of down-time is required for stocking.

For this kind of performance, credit is also due Scripto operators. With no multiple-spindle experience and with as little as 3 months' training on single-spindle machines, they quickly acquired the skill to maintain the Greenlees on continuous production. Mechanical features on the Greenlee — *simplicity of design and ease of tool adjustments* — offer surprising aid today under war-time conditions and promote efficiency on many short as well as long run jobs.

Write today for full facts.

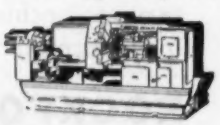
INDEPENDENTLY OPERATED CROSS-SLIDES PERMITTED EFFICIENT TOOLING SET-UP

Photos above show tooling set-up used to produce booster bodies. Cross-slides are independently operated by separate cams — make possible efficient tooling set-ups.

Sequence of Operations

1. Drill large diameter. Rough form two small diameters — turn large outside diameter.
2. Bore large diameter. Form O. D. Face and chamfer end of piece.
3. Rough bore eccentric hole. Shave outside diameters.
4. Roll thread on small O. D. Finish bore eccentric hole.
5. Cut thread on large O. D. Chamfer and break down for cut-off.
6. Tap inside thread. Cut-off.

Gross Production Rate — 400 per hour



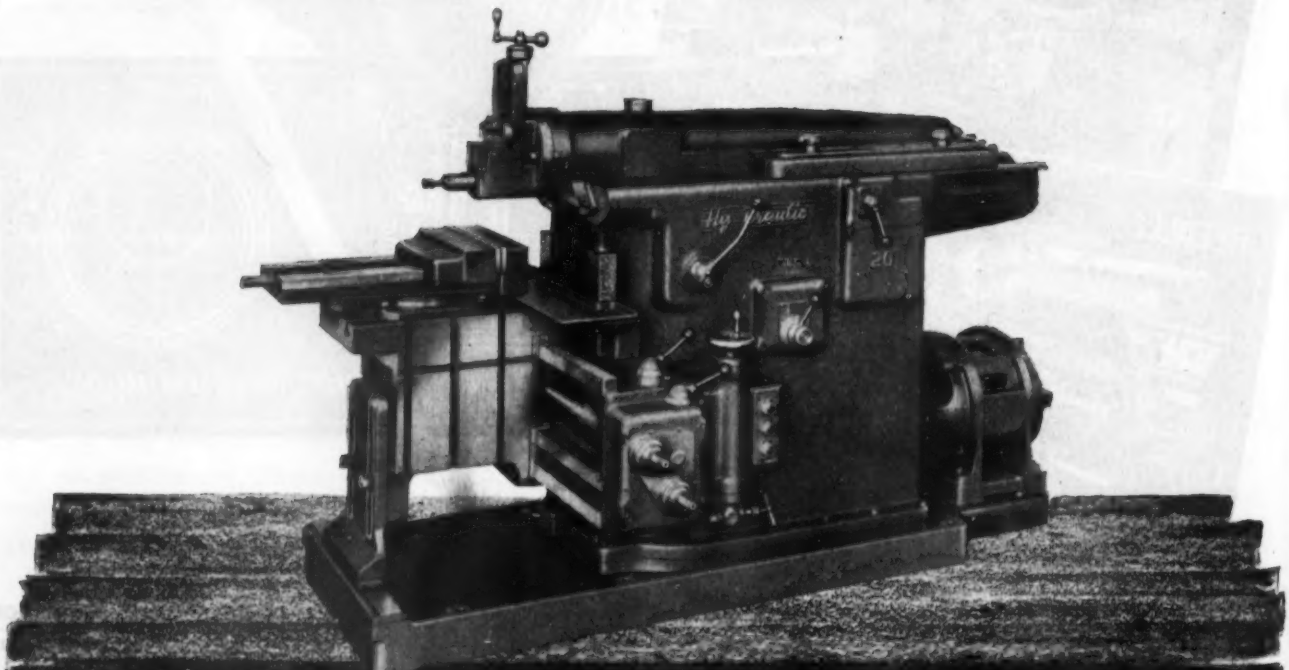
GREENLEE BROS. & CO.
1740 MASON AVENUE, ROCKFORD, ILLINOIS

GREENLEE

MULTIPLE-SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

Hy-Draulic

SHAPERS, 16″ to 28″ STROKE



HAVE THE EXACT SPEEDS AND FEEDS YOU NEED FOR THAT WORK YOU WANT TO DO FAST

Infinite adjustment of cutting speeds and feeds in specified ranges is a most important advantage in Hy-Draulic Shapers. It enables operators to get the *exact* combination of speed and feed needed for top production on each job. To meet changing conditions during the progress of any operation; cutting speed, feed, or both, can be altered quickly and easily without stopping the machine. There are no gears to shift, no clutches to service, nothing to interfere with continuous high output.

Length of ram-stroke, and its position relative to the work-piece, are established in one simple, easy hand-operation while the machine continues to run. This is another very important exclusive feature of Hy-Draulic Shapers. These tools are built in seven sizes, ranging from 12″ High Speed to 36″ Openside. They are accurate, fast, easy to operate; ideal for rugged war work and in highly competitive commercial service. Investigate. Write today for Bulletin 1114.

4407-R-3

ROCKFORD MACHINE TOOL CO., ROCKFORD, ILLINOIS

DALZEN THREAD GRINDER, No. 5, WITH GUARDS REMOVED

IN THREAD GRINDING . . . THE *DRESSER'S* THE THING!

AUTOMATIC DRESSING IS PROVIDED IN THIS *New* DALZEN *Electronic* THREAD GRINDER

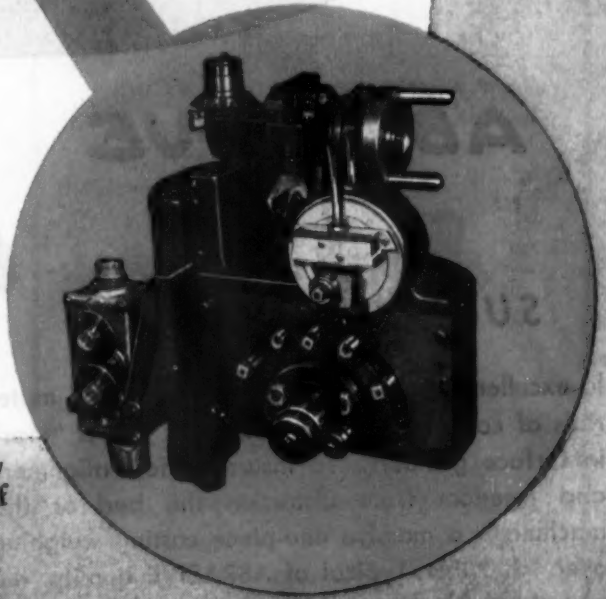
● Accuracy of a ground thread depends upon the accuracy of the dressed wheel. Precision, finish and production efficiency in thread grinding are determined primarily by the dresser.

DALZEN engineers always have recognized this fact. Now . . . the new DALZEN Electronic Thread Grinder presents the latest and best in dresser efficiency—offering new and special advantages in dressing performance.

The new DALZEN Thread Grinder with General Electric Thy-mo-trol drive provides maximum production of threaded parts, thread gages, straight and spiral fluted taps, and thread milling cutters. Grinding speed—both wheel and work—forward and reverse—is adjusted by the twist of a dial. Variation is infinite and stepless. It's an investment in *better* thread grinding, and a *low-cost* investment at that!

An attractive three-color folder describing the new DALZEN Models 5 and 6 will be sent you, free of charge, on request.

In addition to thread grinding machines, DALZEN also manufactures precision ground broaches, thread milling cutters, taps, threaded parts, and the Dalzen "2-in-1" combination center grinder and drill press. Write for descriptive literature.



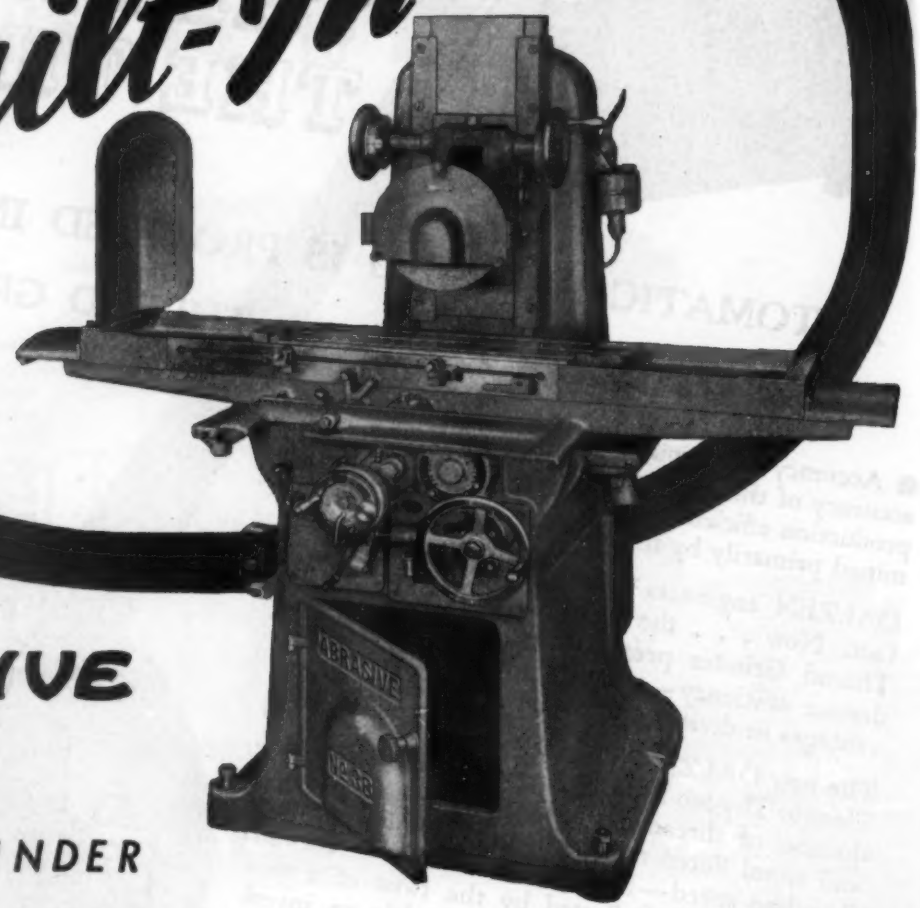
DALZEN

TOOL & MANUFACTURING COMPANY

12255 EAST EIGHT MILE ROAD • DETROIT (5), MICH.

ACCURACY & DEPENDABILITY

"Built-In"



ABRASIVE 3-B SURFACE GRINDER

In excellence of design, workmanship, and materials of construction, the ABRASIVE 3-B is "tops" in surface grinders. To insure perfect alignment and freedom from distortion the bed of this machine is a massive one-piece casting weighing over 1500 lbs. Typical of ABRASIVE quality, the precision spindle of alloy steel, hardened, ground and lapped, is carried in a phosphor bronze box at front, adjustable for wear, and super-precision ball bearings at rear. For accuracy and dependability, specify ABRASIVE 3-B.

ABRASIVE

ACCURACY BOOSTS PRODUCTION

AVAILABLE FOR PROMPT DELIVERY

Send for descriptive Bulletin

ABRASIVE MACHINE TOOL COMPANY, EAST PROVIDENCE 14, R. I. • ***Dealers in Principal Cities***

KEEP YOUR DRILLS IN "new tool" CONDITION WITH THE OLIVER DRILLPOINTER!

Poorly sharpened drills, drills with points off center, with incorrect clearances or unequal point angles will hold up your production! The OLIVER NO. 510 DRILL-POINTER will keep your drills in topnotch condition for long runs of accurate work. Even unskilled operators can grind points that are mathematically accurate in every dimension, points that cut clean and accurately, reducing load on both machine and tool. Oliver-ground drills require less feeding pressure and horse-power to operate, they last longer between grinds, they reduce drill breakage and produce less scrap.

(Write for details.)

OLIVER INSTRUMENT CO.

1410 E. MAUMEE ST.
ADRIAN, MICHIGAN

OLIVER NO. 510 DRILLPOINTER (above). Automatic operation produces patented Oliver variable point angles and variable clearances. Quickly set up for drills from ¼" to 3" dia., for any point angle from 82° to 160°.

OLIVER NO. 21 BENCH DRILL GRINDER (below). Hand operated for drills from No. 57 to ½". Attachments available for grinding oil hole drills and special points.

Don't Neglect Your Toolroom It's the Backbone of Production!

Oliver OF ADRIAN

AUTOMATIC DRILL GRINDERS — TOOL AND CUTTER GRINDERS — DRILL POINT THINNERS — TEMPLATE TOOL GRINDERS — FACE MILL GRINDERS — DIEMAKING MACHINES

NESTED MATERIAL IS SECURELY HELD UNDER HEAVY CUTS ON THE

PORTER-McLEOD COLD METAL SAWING MACHINE

Ability to cut stock from 3 inches up, to nest and hold bars or shapes securely for multiple cutting, combined with a standard feed of 3" per minute enable this modern, sturdy, clean-lined machine to make big savings in cutting-off time. A wide range of work can be handled by the 8" Porter-McLeod because of its capacity for 8" round or 7½" square stock. All cuts are accurately and cleanly made at highest speeds.

Truly high production is assured by unique features of design coupled with ample power. The blade is pulled upward through the stock, the blade being supported in such a way as to prevent buckling or weaving. Protection of the blade against hard spots in the stock being cut is provided by a friction disc feed. The Porter-McLeod blades are designed so that every tooth cuts, a feature which contributes to the remarkably fast cutting assured by this machine.

If you are interested in reducing time on cutting-off operations, get all details at once. Anyway, write for Descriptive Bulletin.

PORTER-McLEOD MACHINE TOOL CO., INC.
HATFIELD, MASS., U.S.A.

MACHINE TOOL COMPANY

SIGOURNEY M-100

COMPLETELY ENCLOSED FOR OPERATOR SAFETY

In the Sigourney M-100 Drilling Machine all moving parts except the chuck and drill are completely enclosed for maximum safety in operation.

Ideal for fine precision drilling and maintained accuracy, the Sigourney M-100 has sealed ball bearings throughout . . . hardened and ground spindles . . . Standard Machine operates at speeds from 4,000 to 10,000 R. P. M., other speed ranges available . . . manufactured in 1, 2, 3 and 4 spindle models.

Send for Illustrated Bulletin

THE SIGOURNEY TOOL CO.
Hartford 6, Conn.

Sole Sales Agents
PRATT & WHITNEY
West Hartford, Connecticut

Avey Sensitive DRILLING MACHINES

CINCINNATI OHIO

DAVIS KEYSEATER

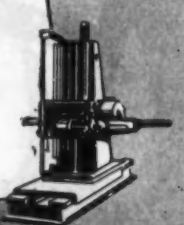
This low cost machine will handle internal keyseating jobs up to 1¼ in.

Write for illustrated bulletin.

DAVIS KEYSEATER CO., 403 Exchange St., Rochester, N. Y.

GILBERT

PRODUCTION SPEEDING RADIAL DRILLS AND HORIZONTAL DRILLING, BORING AND MILLING MACHINES



DETAILS ON REQUEST

THE CINCINNATI GILBERT MACHINE TOOL CO.
CINCINNATI, OHIO

NEW HEAVY DUTY GEARGRIND FORMED WHEEL GRINDER

ARMY E NAVY

GEARGRIND Type 24-48 handles either coarse or fine pitch gears with diameters up to 24", and 48" between centers. It is mounted on an extremely heavy base and the grinding wheel column is exceptionally rigid.

Production has been more than doubled with this machine, due to a combination of many advanced features which include much faster indexing, more rapid travel of the work table to and from the work, simplified push button controls and operator convenience.

The low base provides a low center line of the work. Work areas are painted spot light buff. The result is better visibility, easier, faster inspection, and increased safety for the operator.

GEARGRIND Type 24-48 is a noteworthy addition to our complete line of machines for the Formed Wheel Grinding of external and internal gears, external and internal involute splines, straight splines, serrations and racks. Catalog on request.

FEATURES

Indexing at both ends of stroke or tail stock end only.

Index cycle stop selection from 0 to 400, adjustable at any point in cycle.

Pre-determination of time for truing wheel and automatic travel of grinding wheel carriage to wheel trimming position.

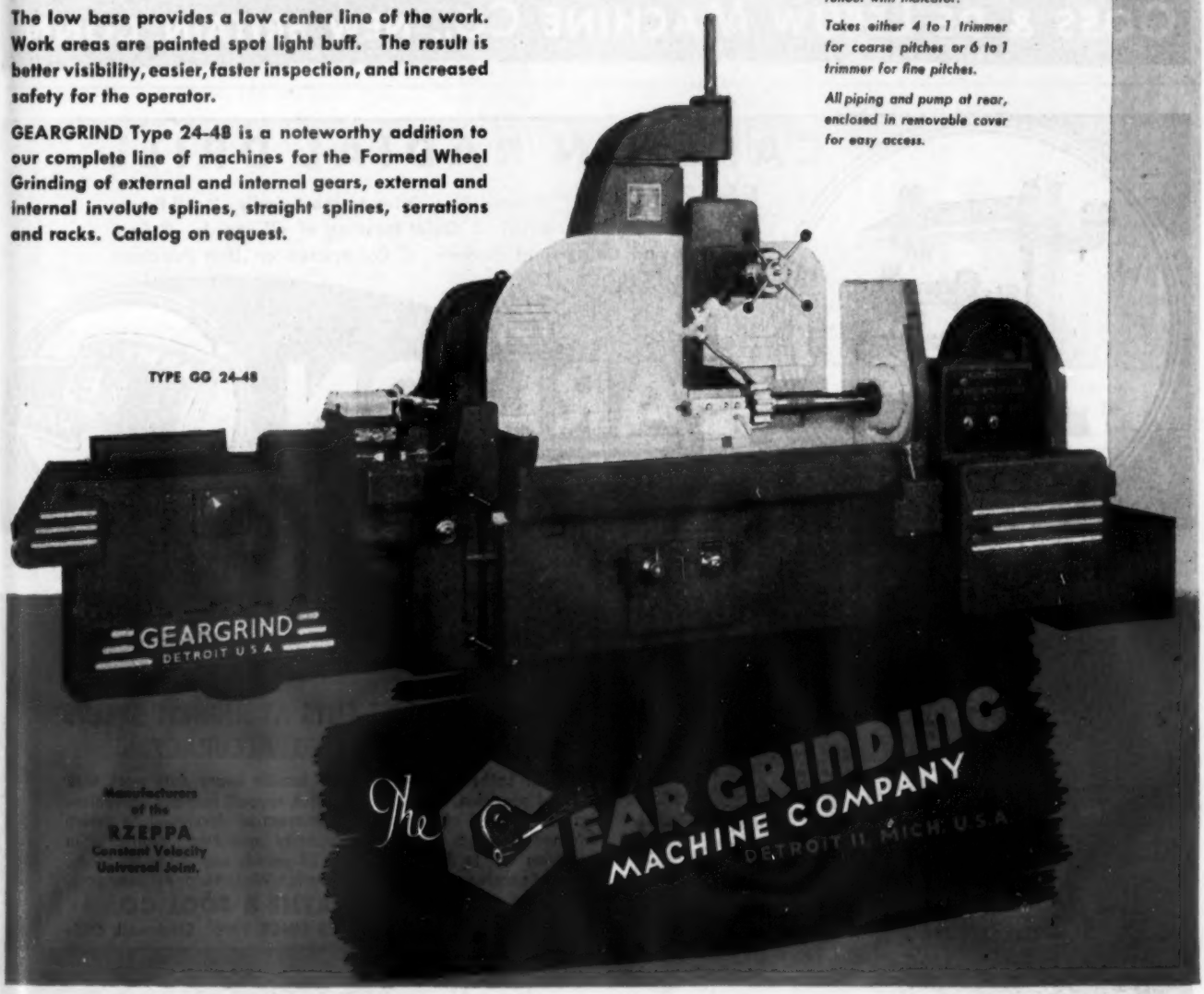
Electric safety circuit stops all carriage movement in case of index failure.

Motor driven work head spindle permits checking work runout with indicator.

Takes either 4 to 1 trimmer for coarse pitches or 6 to 1 trimmer for fine pitches.

All piping and pump at rear, enclosed in removable cover for easy access.

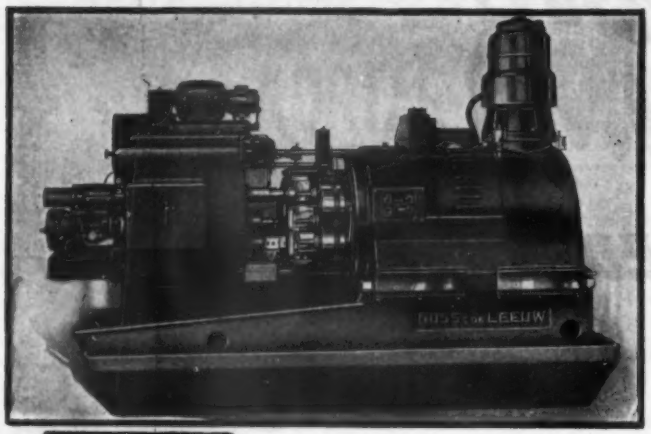
TYPE GG 24-48

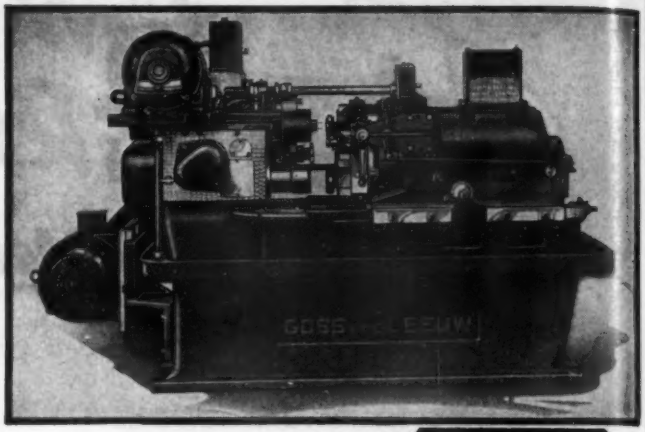


Manufacturers of the RZEPPA Constant Velocity Universal Joint.

The GEAR GRINDING MACHINE COMPANY
DETROIT 11, MICH. U.S.A.

GOSS & DE LEEUW *Multiple Spindle* CHUCKING MACHINES





WORK ROTATING TYPE
5 Spindles
6 Spindles
8 Spindles

Features include:

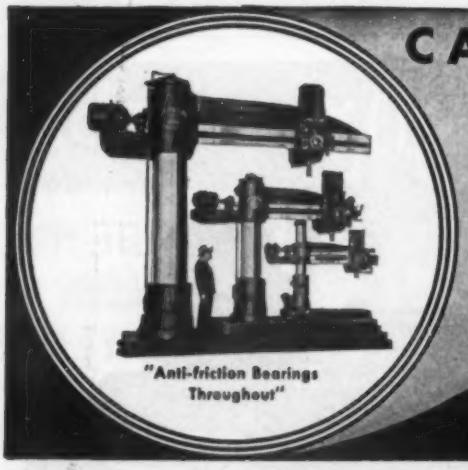
Lead Screw Threading on both types—Preloaded Anti Friction Spindle Bearings—Hardened Ways—Oversize Spindles—Gears of Chrome-nickel steel, carefully heat-treated.

Write for copy of descriptive catalog giving complete, detailed specifications.

TOOL ROTATING TYPE
4 Spindles
5 Chucking Positions

GOSS & DE LEEUW MACHINE CO., NEW BRITAIN, CONN.

CARLTON RADIAL DRILL



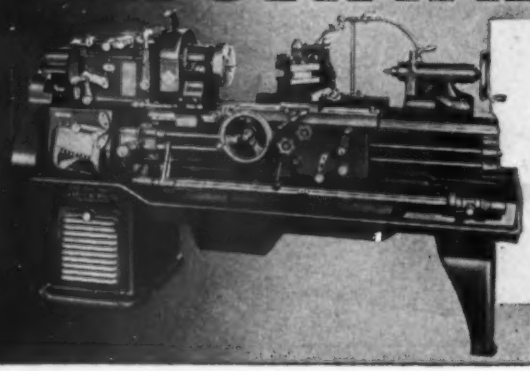
"Anti-friction Bearings Throughout"

FEATURES—1. Low Hung Drive to the Spindle. 2. All Power Driven Parts Running in Oil. 3. Quiet Running at all speeds. 4. Concentrated and Convenient controls. 5. Constructed on Unit Principal.

The CARLTON
MACHINE TOOL COMPANY
CINCINNATI, OHIO, U. S. A.

ARMY E NAVY

CINNATI LATHES

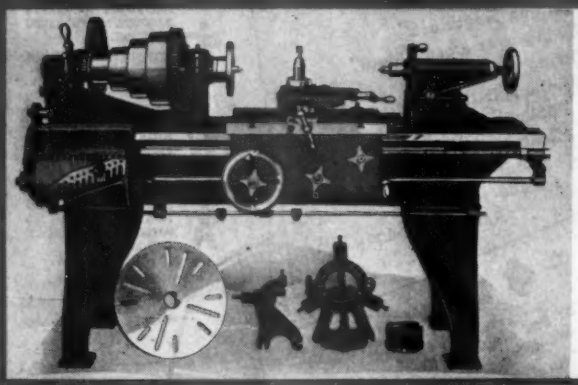


ASSURING HEAVIEST CUTS AT HIGHEST SPEEDS WITH MAINTAINED ACCURACY

Cincinnati Lathes are produced to handle heavy duty work with ease and precision. They are powerful, rugged, fast and convenient with every detail of design and construction developed to assure sustained accuracy under full capacity operation. Available in sizes from 14" to 30", with 12 or 24 speeds and 32 to 96 feeds. Our latest catalog gives complete details. Write today for your copy.

THE CINCINNATI LATHE & TOOL CO.
Rogers Road, Oakley SPECIALISTS SINCE 1906 Cincinnati, Ohio

THE HENDEY QUICK CHANGE GEAR BOX
has had a noteworthy existence.....

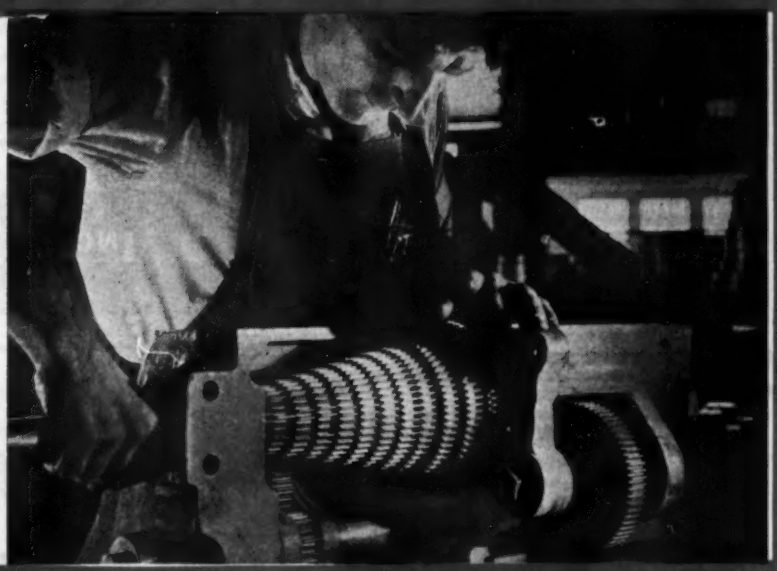


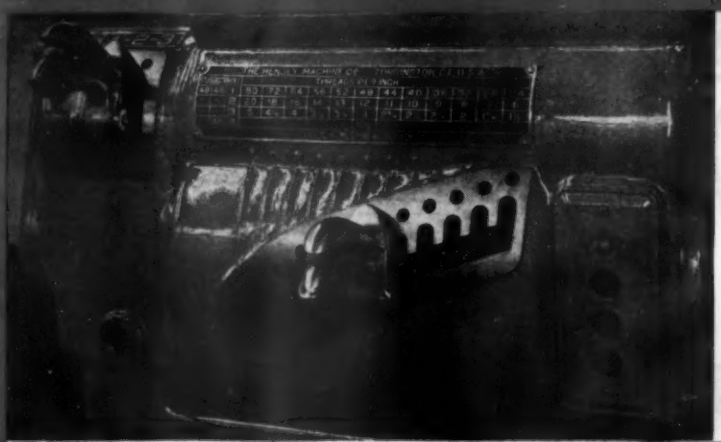
Originally conceived and patented by W. P. Norton, long associated with The Hendey Machine Company—it was first applied to a Hendey Lathe in 1892. At the same time the lathe was equipped with automatic stop and apron reverse mechanism which were important contributing factors in enabling the lathe to take full advantage of the opportunities offered through the quick change gear box to greatly increase its efficiency. Note this original Gear Box application took place some 52 years ago.

The Improved Gear Box of current design is a product of precision workmanship. Gears are made to exacting standards and fitted to shafts with bearing precision. Any gear runout in the smallest degree would be transferred to a thread if being cut, and which may be required produced in a precision quality. Hendey Lathes with precision lead screws have a high reputation for cutting screws that test to precision accuracy.

●

An assembled gear cone being placed in a Hendey Quick Change Gear Box.





The Quick Change Gear Box of Hendey 18-speed Lathes has anti-friction bearings for the lead screw of both ends. An oil sump runs the full length of gear box with an oil level sight gage located at left-hand lower corner. In this position is a cam driven pump which distributes oil through piping to lead screw and rocker shaft bearings and gear studs.

●

Push button station for motor drive is incorporated in the gear box casting, and has current signal light in cover in addition to the start, stop and reverse buttons.

●

This gear box has a range of 1½ to 80 threads per inch. Feeds 6 to 320 per inch.

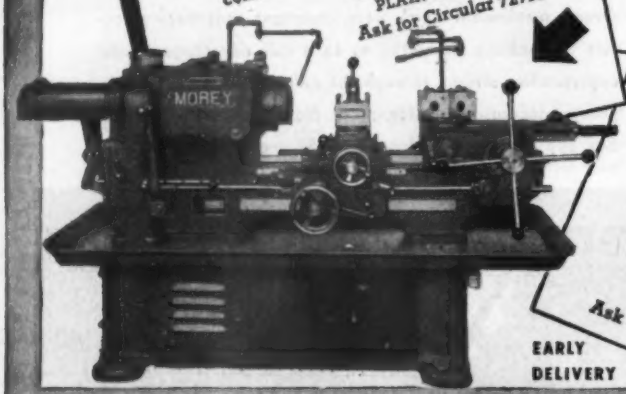
THE HENDEY MACHINE COMPANY, TORRINGTON, CONN.

BOSTON NEW YORK ROCHESTER DETROIT CHICAGO

MOREY TURRET LATHES
for BAR or CHUCKING { UNIVERSAL or PLAIN

3 UNIVERSAL

For bar stock up to 1½" in diameter
10" turning length
16½" swing over bed
Infinite spindle speeds: 55 to 1800 RPM, constant speed motor, 1200 RPM
AVAILABLE ALSO WITH PLAIN CROSS SLIDE
Ask for Circular 727A



2 PLAIN-GEARED

For bar stock up to 1" in diameter
Turning length 6½"
Swing over cross slide 6"
Swing over bed 14"
Infinite spindle speeds:
Minimum of 60 RPM.
Maximum of 2000 RPM.
Constant horsepower at all speeds.
Ask for Circular 629A

4 UNIVERSAL

For bar stock up to 2" in diameter
12" turning length
19½" swing over bed
Infinite spindle speeds: 35 to 1500 RPM, constant speed motor, 1200 RPM
AVAILABLE ALSO WITH PLAIN CROSS SLIDE
Ask for Circular 736A

EARLY DELIVERY

- INFINITE SPINDLE SPEEDS —Electronically Selected—
- DIRECT BELT DRIVE AVAILABLE AT HIGH SPEEDS ELIMINATES GEAR MARKS (patents applied for).
- GEARED SPINDLE SPEEDS INSTANTLY AVAILABLE THROUGH MULTIPLE DISC CLUTCHES.
- SPINDLE MOUNTED ON TIMKEN BEARINGS.
- RIGID—WITH SUFFICIENT POWER TO TURN AT THE HIGHEST SPEEDS AND FEEDS MODERN TOOLS WILL WITHSTAND.
- SPINDLE SPEEDS AND POWER FEED CHANGES WITHIN EASY REACH OF OPERATOR.

ARMY E NAVY

- THE DESIGN OF THE MOREY No. 2, 3 and 4 TURRET LATHES ARE BASICALLY ALIKE. EACH MACHINE IS ENGINEERED FOR THE SIZE WORK IT IS DESIGNED TO HANDLE.

DESIGNED AND BUILT BY
MOREY MACHINERY CO., INC
410 BROOME STREET, NEW YORK 13, N. Y.
PLANT: 4-57 26TH AVE., ASTORIA 2, NEW YORK

LEACH External Grinder

PRICE
$875.00
Fully Equipped

Our dealers will help you fill out necessity priority forms.

Write us today for your nearest dealer's name and address.

Grinds Work from ¾" to 11" in length and from ⅛" to 7" in diameter.

Send for Descriptive Literature

EXCELLENT DELIVERIES

Exclusive Selling Agents
H. LEACH MACHINERY CO.
337 CHARLES ST. PROVIDENCE, R. I.
Agents in all Principal Cities Throughout the World

KNIGHT VERSATILE MILLERS ACCURATE RIGID

FOR FURTHER DETAILS SEE FULL PAGE AD IN PREVIOUS ISSUE

W. B. KNIGHT MACHINERY CO.
ST. LOUIS MISSOURI

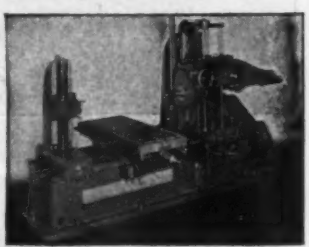
Giant KEYSEATERS

For cutting internal keyways, slots or splines 1/16" to 4" wide and up to 60" long. Fast—Accurate—Flexible. Write for particulars and catalog on machine for your work.

MITTS & MERRILL
913 Tilden St.
Saginaw, Michigan

UNIVERSAL *Horizontal Boring Machine*
The only TRIWAY *Boring Machine Built*

Made in 3" and 4" spindle sizes. Write for complete, detailed specifications.

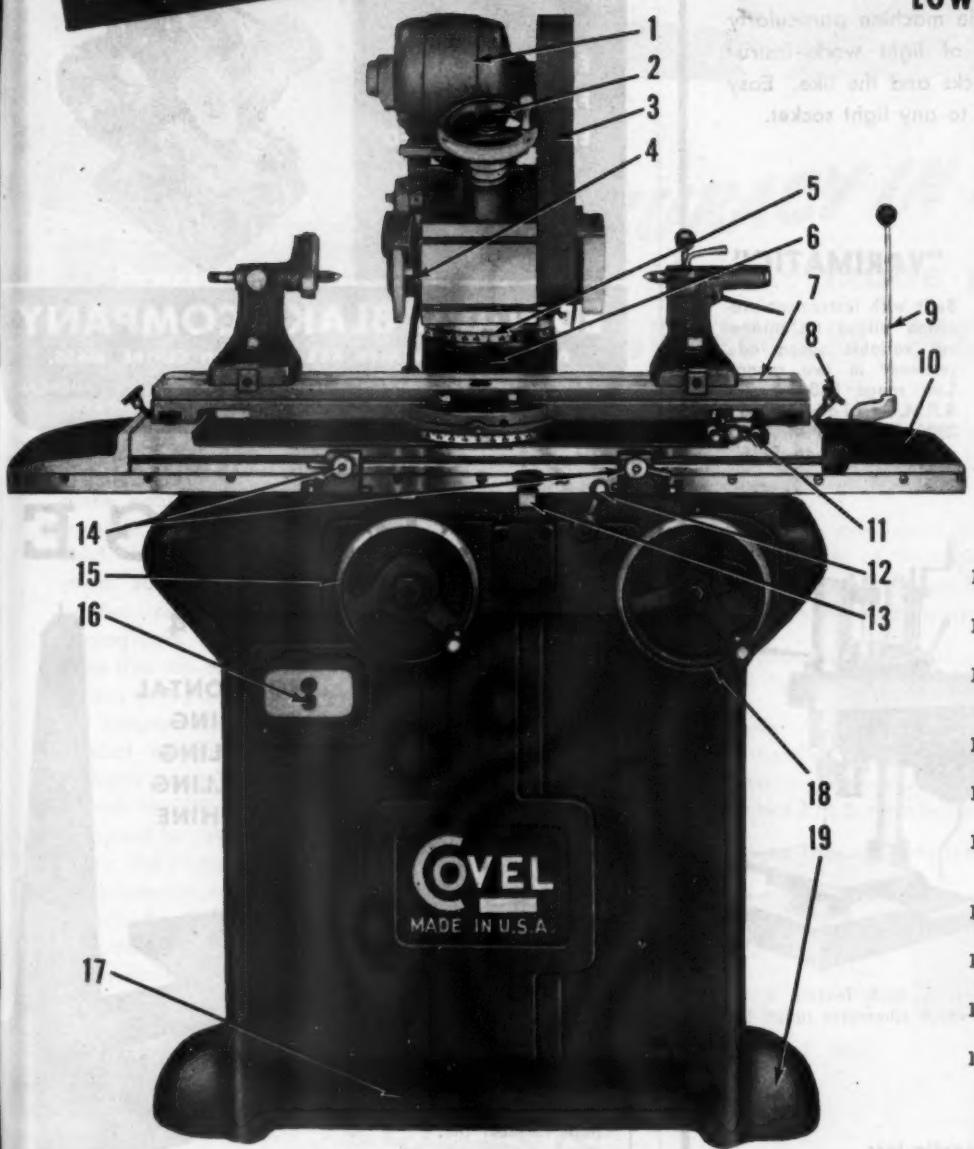


Standard Universal 3" Spindle Machine

UNIVERSAL BORING MACHINE CO.
Hudson, Mass., U. S. A.

19 Reasons Why COVEL NO. 12 Universal Cutter and Tool Grinder MEETS TODAY'S DEMAND—and TOMORROW'S

FOR SPEED, ACCURACY, LOW-COST PRODUCTION



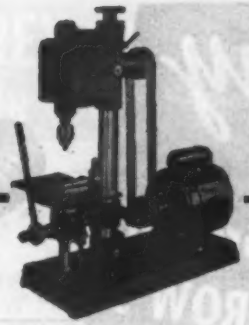
1. ¾ H. P. spindle drive motor conveniently located, 3-speed V-belt pulley.
2. Elevating hand wheel with floating dial.
3. Belt guard splits for easy opening to change speeds.
4. Quill-type ball bearing spindle. Large, rugged and accurate.
5. Head swings on vertical adjustable column graduated in degrees.
6. Telescoping Metal Dust Guards.
7. Top table adjustable for taper grinding. Can be revolved 180° to increase capacity 3".
8. Quick-acting End Clamps.
9. Hand-rapid table traverse lever is removable, adjustable, convenient.
10. Table and cross-feed saddle move on balls.
11. Fine screw adjustment for taper.
12. Lock for sub-table (saddle and column locks also provided).
13. Table stops slide back, permitting dogs to pass.
14. Fine screw adjustable table dogs.
15. Large graduated cross feed hand wheel with floating pointer.
16. All electric switches are convenient to operator.
17. Toe-room in front of base for operator comfort.
18. 2-speed hand wheel for longitudinal table travel.
19. Cover plates over hold-down bolts.

Write for Bulletin No. A-204.

GRINDING MACHINERY SINCE 1874

COVEL INDUSTRIAL GRINDERS

COVEL MFG. CO., BENTON HARBOR, MICHIGAN U. S. A.



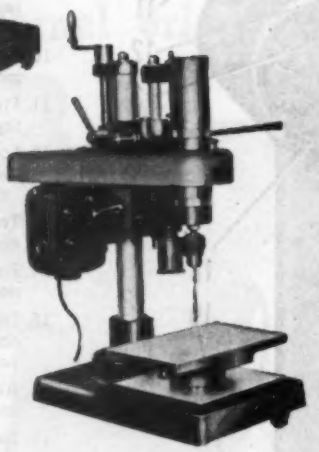
HAMILTON MUEHLMATT SENSITIVE TAPPER

A high production sturdy little machine particularly suited to precision tapping of light work—instruments, cameras, watches, clocks and the like. Easy to operate—can be attached to any light socket.

"VARIMATIC"

Built with instrument precision allows instantaneous variable speed adjustment in two ranges. Low range 840 — 270 R.P.M. High range 2900—9300 R.P.M. Drill capacity .004" to 5/16".

MAXI-JR-E



Designed and built for accurately drilling small holes .004" to .250" diameter. It consists of a self contained drilling unit which swings radially on the column and may be locked in any desired position. This extremely flexible small drilling machine may be ganged for sequence operations or to increase production. Spindle speeds from 750 to 8,750 R.P.M.

The "Varimatic" and the Maxi-Jr.-E each feature a full floating spindle of special design which eliminates radial belt pull on the spindle.

•

Write for full particulars on any or all of the machines shown.

The Hamilton Tool Co.

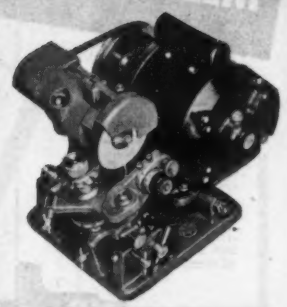
[illegible] NINTH ST. HAMILTON, OHIO

Waltham CUTTER SHARPENER

For fast, economical, accurate sharpening of cutters for gear cutting and thread milling, circular form tools, straight fluted hobs, and multiple cutters not over 2" in diameter and 3/8" thick. Standard machine uses index plates. Pawl attachment for locating on top or back of teeth available as extra.

Send for Bulletin No. 344 which gives complete construction and operating details.

ECONOMICAL
FAST, ACCURATE
EASILY OPERATED



EDWARD BLAKE COMPANY

634 COMMONWEALTH AVE., NEWTON CENTRE, MASS.

BLAKE TAP GRINDERS — FILTAIRE PORTABLE DUST COLLECTORS — AMERICAN TOOL HOLDERS — BLACK DIAMOND PRECISION DRILL GRINDERS

PORTAGE

NO. 4 HORIZONTAL BORING DRILLING & MILLING MACHINE

• Designed and built to meet the need for speed and accuracy demanded of today's production.

WRITE TODAY

for fully illustrated bulletin giving detailed description of the many features of this Horizontal Boring, Drilling and Milling Machine. No obligation.

THE PORTAGE MACHINE CO.

AKRON 11, OHIO

At Right: Small shutter parts being honed on Sunnen "MA" Precision Honing Machine.

Below: Navy photographer using Fairchild F56 Aerial Camera with 8¼" focal length for oblique photography.

Precision-Built FAIRCHILD Aerial Cameras

The bulk of the aerial cameras, which make accurate aerial photography possible, is manufactured by the Fairchild Camera & Instrument Corporation. These versatile cameras, of various sizes and models, take aerial photographs from heights ranging from tree-top to 40,000 feet, either at day or night, and under extremes of temperatures, atmospheric and combat conditions. Fairchild aerial cameras range in weight from 11 pounds to 200 pounds, and each is designed for uses as required by the Army and Navy Air Force. Although these cameras are rugged enough to withstand all operating conditions, they must also be compact and precision-made.

Accuracy in Action!

—made possible by SUNNEN HONING

For high precision work on small vital parts such as segments for camera shutter leaf centers, cam pawls, pallets, ratchet wheels, and bushings, Fairchild *uses Sunnen honing.*

After grinding, these parts are honed to extreme accuracy — often within .0001". The inside surfaces of these diameters must be polished to a super-smooth finish to reduce friction on bearing surfaces — for these parts must operate faultlessly at temperatures from —70° F. to 165° F.!

Here again is real tribute to the amazing accuracy and super-smooth finish made possible by Sunnen honing.

Remember — the Sunnen Model "MA" Precision Honing Machine handles any diameter from .185" to 2.625" with a *guaranteed* accuracy of .0001" and a finish of 2 to 3 micro inches.

Write for new bulletin giving complete information!

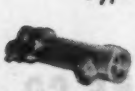
The coveted Army-Navy "E" waves over the Sunnen plant — evidence of the important part Sunnen equipment is playing in the war effort.

SUNNEN PRODUCTS CO., 7941 Manchester Ave., St. Louis 17, Mo.

Canadian Factory: Chatham, Ontario

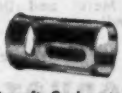
SUNNEN

Typical Jobs



Aircraft Hydraulic Brake Cylinder. Honing 3 times faster than lapping — and gave a straighter hole.

Aircraft Valve Tappet Roller. Honed after grinding to give 100% bearing surface.

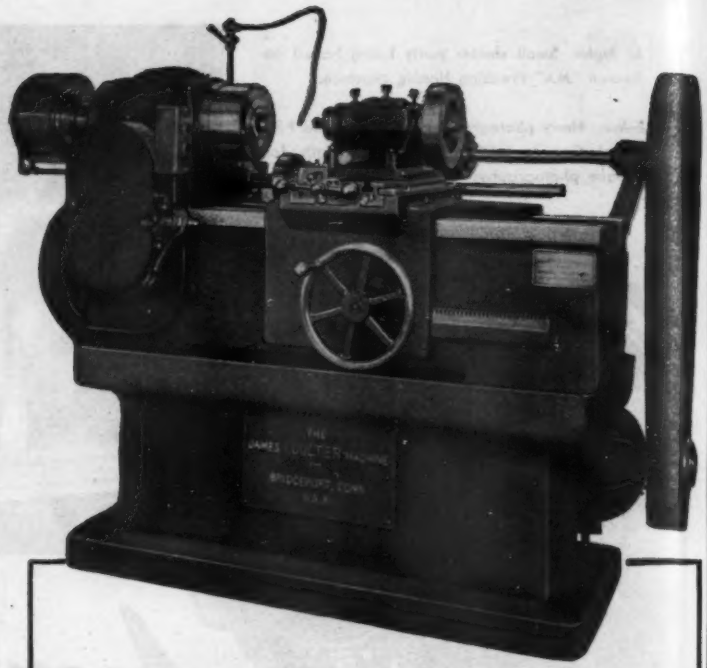


Aircraft Carbureter Operating Valve Sleeve. Sunnen honing eliminates distortion from assembling operation.

Hydraulic Control Bushing. Honing gives straight round hole after rough reaming.

Aircraft Piston Pin. Sunnen honing is twice as fast and gives a cleaner, better looking pin.

Keep Ahead of DEFENSE DEMANDS on the PRODUCTION of EXTERNAL and INTERNAL THREADS



The Coulter Type "H" Hob Thread Miller—modern in every detail of design and construction—handles high speed, accurate production of right or left hand threads. Any parts that can be held in ordinary chucks, air operated chucks, air operated collet chuck or special face plate fixture can be threaded on this machine.

Work holding spindle and cutter spindle are driven by individual motors through worm and gears. Speed changes to work spindle are accomplished by pick-off gears; cutter spindle speeds are controlled by variable motor sheave. All high speed shafts turn in anti-friction bearings.

Maximum external thread, 7"; minimum hole depends on smallest hob practical.

Send for Descriptive Bulletin giving full information.

The James COULTER Machine Co.
BRIDGEPORT • CONNECTICUT • U.S.A.

IT'S IN THE *Air!*

AIR CONTROL is the Secret of precision tapping The Haskins Way

Accuracy—to a class 4 fit when necessary—is constant—each part is tapped exactly like every other, independent of operator efficiency. AIR regulates the complete tapping cycle—not only the down stroke, but its control is so sensitive that the tap is allowed, in effect, to float out of the part. Tap life is longer—tap breakage practically eliminated. Send today for your copy of catalog on Tapping—The Haskins Way. R. G. Haskins Co., 2761 W. Flournoy St., Chicago, Illinois.

HASKINS *haskins*
PRECISION TAPPING EQUIPMENT

PUT YOUR LIGHT PRECISION DRILLING on the TYPE 25 REED BENCH DRILL for SPEED and SAVINGS

Greater ease and economy are assured on small work by using this simple, strong, convenient machine in preference to larger units. It is particularly designed for light work and adaptable to a wide variety of drilling operations. Its speed and versatility make it a valuable machine for time and money savings in any shop. With all moving parts (except chuck) fully enclosed, it provides maximum safety for women operators.

An instantly available hand-wheel controlled speed range from 1500 to 10,000 R.P.M. is provided, together with speed indicator. Made in from 1 to 4 spindle types.

Features and Specifications

Spindle mounted on Precision Ball Bearings
Individual Motor and Drive to each spindle
Motor ½ H.P. Ball Bearing
Capacity ¼". Jacobs Chuck 7-1A

Write for complete details.

PRODUCTION MACHINE CO.
Manufacturers of Drilling Machines, Tool Grinders and Hand and Automatic Polishing and Grinding Machines.
GREENFIELD, MASS., U. S. A.

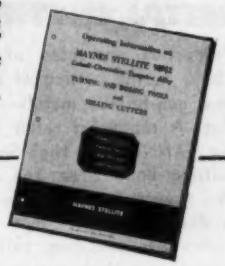
HAYNES STELLITE 98M2 ALLOY ROUNDS

These Cobalt-Chromium-Tungsten Rounds are used for . . . .

- Turning, Boring, or Facing Tools.
- Machinery Parts Where a High Resistance to Abrasion, Heat, and Corrosion is Required.

• These cobalt-chromium-tungsten alloy rounds are finished on centerless grinders to standard limits of plus 0.000 in., minus 0.002 in. on diameter; plus or minus 1/16 in. on length, unless otherwise specified. The twelve standard sizes listed below are available for prompt shipment. Special sizes to users' specifications can be furnished on request.

For information on how HAYNES STELLITE tools can be used to increase production at lower cost per piece machined, send for the booklet, "Operating Information on Haynes Stellite 98M2 Tools." Ask for Form 5350.



Haynes Stellite Alloy Standard Rounds are Available in These Sizes

Diameter, in.	*Maximum Length, in.*	*Diameter, in.*	*Maximum Length, in.*
1/8	2	9/16	6
1/4	4	5/8	6
5/16	4	11/16	6
3/8	5	3/4	6
7/16	6	7/8	6
1/2	6	1	6

HAYNES STELLITE TRADE-MARK

HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation

New York 17, N. Y. UCC Kokomo, Ind.

Chicago—Cleveland—Detroit—Houston—Los Angeles—San Francisco—Tulsa

• HIGH-PRODUCTION METAL-CUTTING TOOLS •

"Haynes Stellite" is a registered trade-mark of Haynes Stellite Company.

SHAPING *in addition to* MILLING, DRILLING *and* BORING . . . *now available on*

Bridgeport

TURRET MILLING MACHINES

The new Bridgeport Shaping Attachment adds an extra feature which makes these machines capable of almost unlimited utility. Design is such that this new attachment can be mounted not only on existing Bridgeport Turret Milling Machines (shown here on back end of overarm) but also on other types of milling machines and special production equipment. Shaping operations can be performed at all angles making this attachment fast, and practical on die and mold work of all kinds as well as for intricate slotting on production jobs. The Bridgeport Shaping Attachment is now in production and is available promptly.

Investigate This Versatile Machine

The Bridgeport Turret Milling Machine with High Speed Milling Attachment handles milling, drilling and boring at all angles with maximum ease and convenience. It can be depended on for accuracy and speed on a wide range of work. It is sturdy and powerful—a precision machine for production demands.
Features of the machine include: 15" diameter turret with 5" overarm, rugged construction, table, knee and saddle in convenient front-of-machine position, anti-friction bearings throughout, keyed overarm with worm wheel control for angular settings, large diameter graduated dials.

Bridgeport High Speed Milling Attachments are available as separate units (¼ HP and ½ HP) for use on other types of milling machines and production equipment. They are extensively used in all branches of the metal working industry and making a valuable contribution to war production.

Write for Illustrated Bulletins giving complete detailed information on Bridgeport Turret Milling Machines and Bridgeport Shaping and High Speed Milling Attachments.

THE BRIDGEPORT MACHINES, INC., *Bridgeport, Conn.*

SAW IT • • *IT'S FASTER!*

WITH *Tannewitz* METAL CUTTING BAND SAWS

Production increases of 50% to 100% in the cutting of sheet steel and non-ferrous metals—formed or flat—is the usual result of installing TANNEWITZ High Speed Metal Cutting Band Saws. The reason for this phenomenal production increase is due to the fact that these machines are precision built to provide better than two miles of vibrationless sawblade travel per minute and hence slide through the work with the greatest of ease. Many patented features put them entirely in a class by themselves. It'll pay you to get the complete facts. *Just ask for Metal Cutting Band Saw bulletin.*

KIND OF MATERIAL	THICKNESS OVER WHICH PER SECOND IS ADVISED							
	1/32	1/16	1/8	1/4	1/2	1	2	3
Mild Steel	32-24	6	3	1				
Stainless Steel	8	2	1	.				
Yellow Brass, Zinc	24	12	6	3	1½	¾	⅜	⅜
Bronze or Copper	6	3	1½	¾	⅜	⅜		
Aluminum	24-16	10	9	4½	2	1½	1	⅜
Duralumin	24	12	5.6	5	1½	1	½	½
Single Fiberoid				6	4			
Double Fiberoid				4	3			
Plywood	24-16	24	20	16	12	6	3	1½
Asbestos Board	12	6	3	1½	¾			
Fibre (Hard)	24	12	6	¾				
Paper Board	24	16	12	4	2	½		
Masonite	24	10	12	6	3	1½	¾	⅜
Bakelite	12	6	3	1½	¾	⅜	3/16	

Other bulletins worth writing for: "SINGLE AND VARIABLE SPEED BAND SAWS FOR FOUNDRY USE"; "BAND SAWS FOR DIE-SAWING"; "INSIDE AND OUTSIDE FILING AND POLISHING".

THE TANNEWITZ WORKS, GRAND RAPIDS, MICH

SMITH & MILLS
CRANK SHAPERS

sizes 12" to 32" stroke

THE SMITH & MILLS CO. Cincinnati, Ohio

LELAND-GIFFORD COMPANY · WORCESTER MASS. U.S.A. · MACHINE BOOKS-CRANK SHAFTS

Drilling and Tapping Machines
(Automatic and Semi-Automatic)

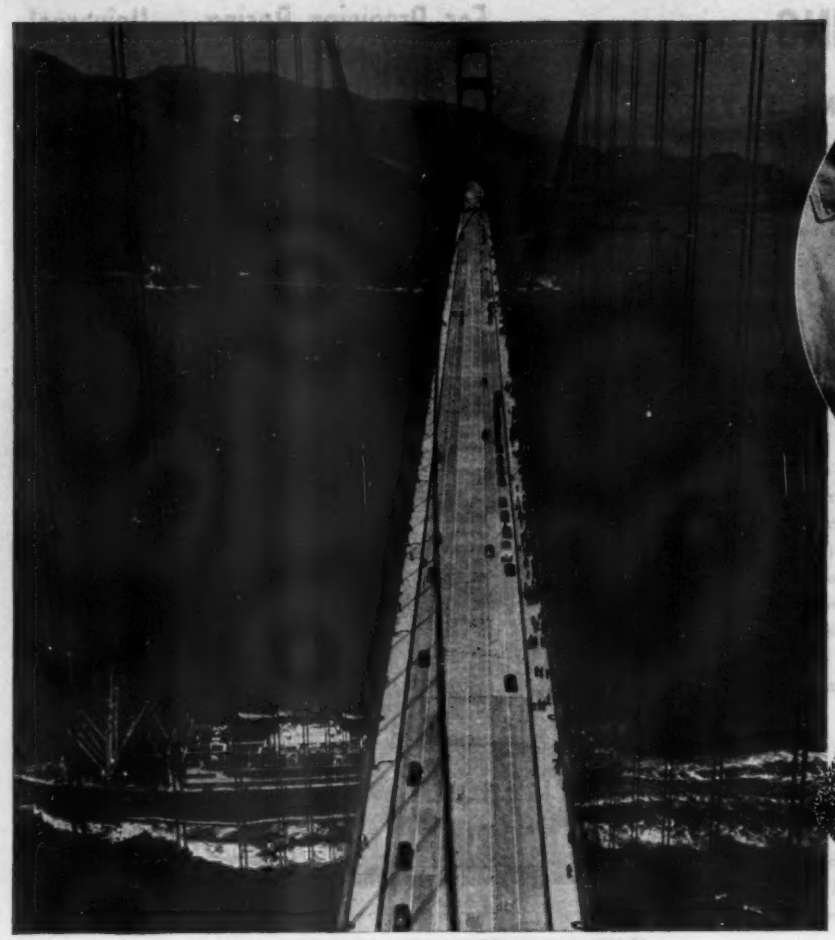
LELAND GIFFORD CO.
WORCESTER, MASS.

Why the Vertical Roto-Matic Will Increase Your Drilling Production

. . . . is explained in this **FREE BOOKLET**

The ROTO-MATIC principle of continuous operations will enable you to drill, ream, bore, face, mill, etc., more parts in less time. Write for this booklet today; learn the many advantages of the ROTO-MATIC and how it can be specifically applied to your work. Ask for Bulletin No. C-100.

Davis and Thompson Co.
Mfrs. of Machine Tools and Micrometers
6411 W. Burnham St. • Milwaukee 14, Wisconsin



Lifting a bridge's face—with a brush

Osborn Brushes help maintain bridges and speed traffic over and under them

BRIDGES like this giant San Francisco span require continuous "face lifting"—to remove the rust that would otherwise corrode them. Crews of workers, using Osborn brushes, operate every day in the year—giving this great bridge, and others, a vitally necessary beauty treatment.

Not only do brushing wheels keep bridges in operating trim, but the traffic that passes over them—automobiles, buses, trucks—all have hundreds of parts which were deburred and finished with power brushing. Likewise the traffic that passes under bridges—merchant ships and warships alike . . . are maintained with Osborn Brushing Wheels. And thousands of brushing operations were necessary *before they came down the ways!*

Brushing wheels as developed by Osborn, 50-year pioneer and leader in the field, have been *proven* under wartime stress—the best tools for all surface finishing work.

In developing your new products—whatever they are—it will pay you to consider the great versatility of Osborn brushes . . . to make your product perform better, look better, sell better.

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue *Cleveland, Ohio*

Osborn Brushes

WORLD'S LARGEST MANUFACTURER OF BRUSHES FOR INDUSTRY

For POST-WAR RE-TOOLING . . .

HERE'S A TIME SAVER

Getting into production for post-war work is going to be tough . . . and those who are late will suffer in the close competition for sales.

Countless small toolroom jobs will be needed . . . in a hurry . . . so investigate the Linley . . . an all-round, compact, speedy unit for relieving large-capacity machines for their rated duties.

Eight speeds — 275 to 4250 r.p.m., direct micrometer setting, velvet feed, no backlash in quill travel, generous table size and travel, grease-sealed bearings . . . and above all, precision machining with easy set-up and fast changeover. It's a time saver and money maker in any shop.

BULLETIN ON REQUEST

LINLEY BROTHERS COMPANY
664 STATE ST. EXTENSION
BRIDGEPORT 1, CONN.

For Precision Boring — Universal MIKRO-LOK Boring Bars

♦ You can Depend on Micrometer Graduations for Controlling Hole Size

For finishing cuts with extreme accuracy. Extremely rigid. Easily and quickly adjusted like a micrometer to within .0005 All standard type shanks available. Singly or in sets. Write for catalog.

Army-Navy "E" Flag Two Stars

Fighter Plane Given by employees

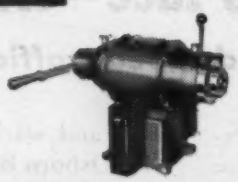
20%

20% Employees Bond deductions

UNIVERSAL ENGINEERING CO.
FRANKENMUTH, MICHIGAN

CHAUER Speed Lathes

WRITE FOR CAT. 440



Ideal for secondary finishing operations on small metal and plastic parts • polishing • deburring • lapping • grinding.

SCHAUER MACHINE COMPANY
ORIGINATORS OF TODAY'S SPEED LATHES
2067 READING ROAD . . . CINCINNATI 2, OHIO

LUERS

Patented Cutting Off Tool Holders
Patented Cutting Off Blades

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured By
J. Milton Luers — 12 Pine St. — Mt. Clemens, Mich.
Produced under License Issued by John Milton Luers Patents Inc.

LUCAS "PRECISION"

Horizontal Boring, Drilling and Milling Machine
THE LUCAS MACHINE TOOL CO.

NOW AND ALWAYS OF

CLEVELAND
OHIO, U. S. A.

POWER HACK SAW ★

12 and 14-Inch Blade

LOW PRICED
•
PORTABLE
SELF-CONTAINED
•
READY TO WORK
STURDY
ECONOMICAL
Write for Bulletin No. 100

MILLER-KNUTH MFG. CO. OMAHA, NEB.

MILLHOLLAND

Automatic DRILLING - BORING MILLING - TAPPING Units

½ to 20 HORSEPOWER DRIVE

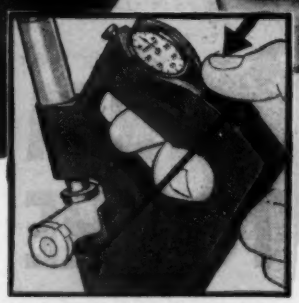
AUTOMATIC and SEMI-AUTOMATIC PRODUCTION MACHINERY

W. K. MILLHOLLAND MACHINERY CO.
Indianapolis, Ind.

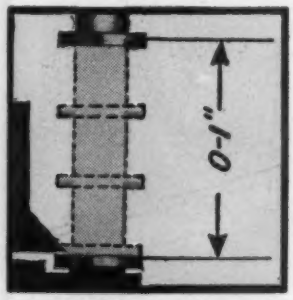
Why Not SEE

Rather than feel

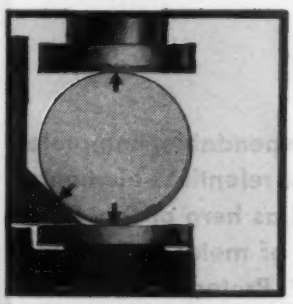
Weight of Gage and operator's hand rests upon the fixed contact. Gage is only ⅝" wide.



A *light* thumb pressure retracts the sensitive contact. Work surface is not marred. The contact movement is transferred direct to Indicator.



The upper or reference contact is adjustable to any dimension within one inch.



Backstop locates work in center of contacts and is adjustable for size.

FEDERAL

INDICATOR SNAP GAGE *with-Retractable Anvil Adjustable for Size No Lost Motion*

This Model 1330 P-100 Visual Dial Indicator Snap Gage marks a decided step ahead in gaging practice. Conventional type, fixed or solid snap gages depend upon "feeling", and personal variations in the sense of touch influence the inspection accuracy. But, you **see** with this.

The Model 1330 P-100 has other advantages too — **The retractable anvil** makes it easier to apply, and it eliminates all excuses for marring the surface of highly finished workpieces. **It is easily adjusted** to any dimension within one inch and locked in place. **There is no lost motion.** The movement of the sensitive contact is transferred directly without error to the Dial Indicator. **The weight of the Gage and the inspector's hand rests upon the fixed or reference contact. It is thin:** only ⅝". It is small; not over 6" at the longest point. It is light; weighs only 15 ozs. It reads in tenths (.0001"). Contacts are hard wearing Norbide (Made by Norton Co.) For more details concerning this modern snap gage write

FEDERAL PRODUCTS CORPORATION
1144 EDDY STREET **PROVIDENCE 1, R. I.**

★ ★ ★ ★ ★ **FEDERAL** ★ ★ ★ ★ ★

PRECISION MEASURING INSTRUMENTS

ARMED TO THE TEETH AND PROTECTED BY UDYLITE

Like the "almost" invincible Achilles, America's fighting machines must have dependable, complete protection from attack. Attack not only from bombs and bullets but also from the relentless elements to which they are constantly subjected. ★ The name UDYLITE has never blazed as hero of this fight nor figured in the headlines of the day—yet it is difficult to name a single piece of metal war equipment or a single fighting machine which does not carry "protection by Udylite". Protection afforded by reliable Udylite equipment and our many perfected processes. In jobs that must not fail they choose UDYLITE.

THE UDYLITE CORPORATION

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Long Island City 1, N. Y.
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Cleveland 3
4408 Carnegie Ave.

ANNOUNCING THE

New WETMORE REAM-MOR PROCESSED REAMER BLADES

GREATER WEAR RESISTANCE

LONGER CUTTING LIFE

LOW IN COST

REAMER BLADES that are—longer wearing, harder, tougher, better cutting—those are the results of Wetmore REAM-MOR processing.

These new blades were developed through long research and experimental work done by Wetmore metallurgists and engineers, in the laboratory, plant and field. They are the product of broad reamer experience and a desire to create an economical high speed steel blade specially processed, that would have the wear resistant qualities of "premium" alloys.

Developed by a reamer manufacturer especially for better, low cost reaming, Wetmore REAM-MOR Blades are another example of Wetmore Quality Tool Service. Available for all model Wetmore Reamers—why not try a set and increase production, reduce grinding—and lower blade costs.

Send for the New REAM-MOR blade bulletin for complete details.

WETMORE REAMER CO.

410 North 27th Street, Milwaukee 8, Wis.

WETMORE REAMERS... BORING BARS

SAFETY

GRINDING WHEELS ...are Built for YOUR Exacting Jobs!

PLEASE bear in mind that SAFETY Grinding Wheels are not so-called "general purpose" wheels. On the contrary, there's a SAFETY especially engineered to do a specific job . . . tailor-made to fit your needs.

That's one of the reasons why SAFETY Wheels give such an outstanding performance where the going is roughest and toughest . . . why plants everywhere standardize on these wheels to be fortified against exacting and changing specifications in war-production programs.

And yet, tailor-made as they are, your needs have been anticipated, so that today there's a definite SAFETY for a definite job available for prompt delivery. More than that . . . there are SAFETY distributing centers and SAFETY engineers in eleven key cities to give you speedy and efficient service. Let us suggest the SAFETY Grinding Wheel to solve your problems!

SAFETY PRODUCTS ARE BOOSTING OUTPUT —CUTTING COSTS!

"Rite-Speed" Grinders
Portable Grinders
Swing Frame Grinders
Floor Stand Grinders
Ask for descriptive booklets!

For quick action, get in touch with one of the SAFETY offices listed below, or with our factory direct. No obligations, ever!

SAFETY

GRINDING WHEEL AND MACHINE COMPANY

Main Office and Factory SPRINGFIELD, OHIO, Phone 4651

● Birmingham—3-3323 ★ Chicago—TRiangle 8308 ★ Cleveland—EXpress 1445 ★ Detroit—TOwnsend 8-4740
★ Pittsburgh—COurt 2822 ★ Erie—23-093 ★ Philadelphia—WAlnut 3132 ★ St. Louis—CEntral 3676
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● SALES OFFICE ★ SALES OFFICE and WAREHOUSE

FASTER PRODUCTION

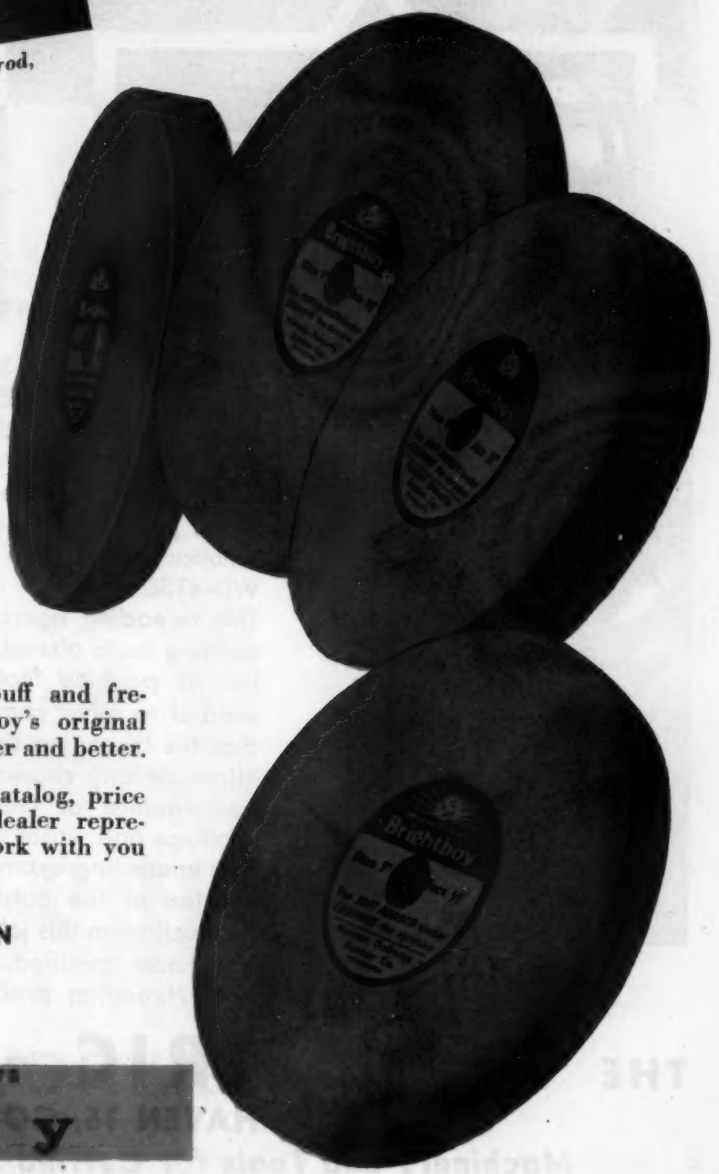
FOR LIGHT WEIGHT AUXILIARY MOTORS

ALOFT...

and AFLOAT

Brightboy-finished cylinder dome, connecting rod, wrist pin and link rod.

Left: Brightboy-polished cylinder dome; right: dome before polishing.



Twenty times the speed of a previous operation in cylinder dome polishing....

At least a six-fold time-saving in finishing link rods....

—these are results achieved through the adoption of rubber-cushioned Brightboy Abrasives by a manufacturer of lightweight auxiliary engines.

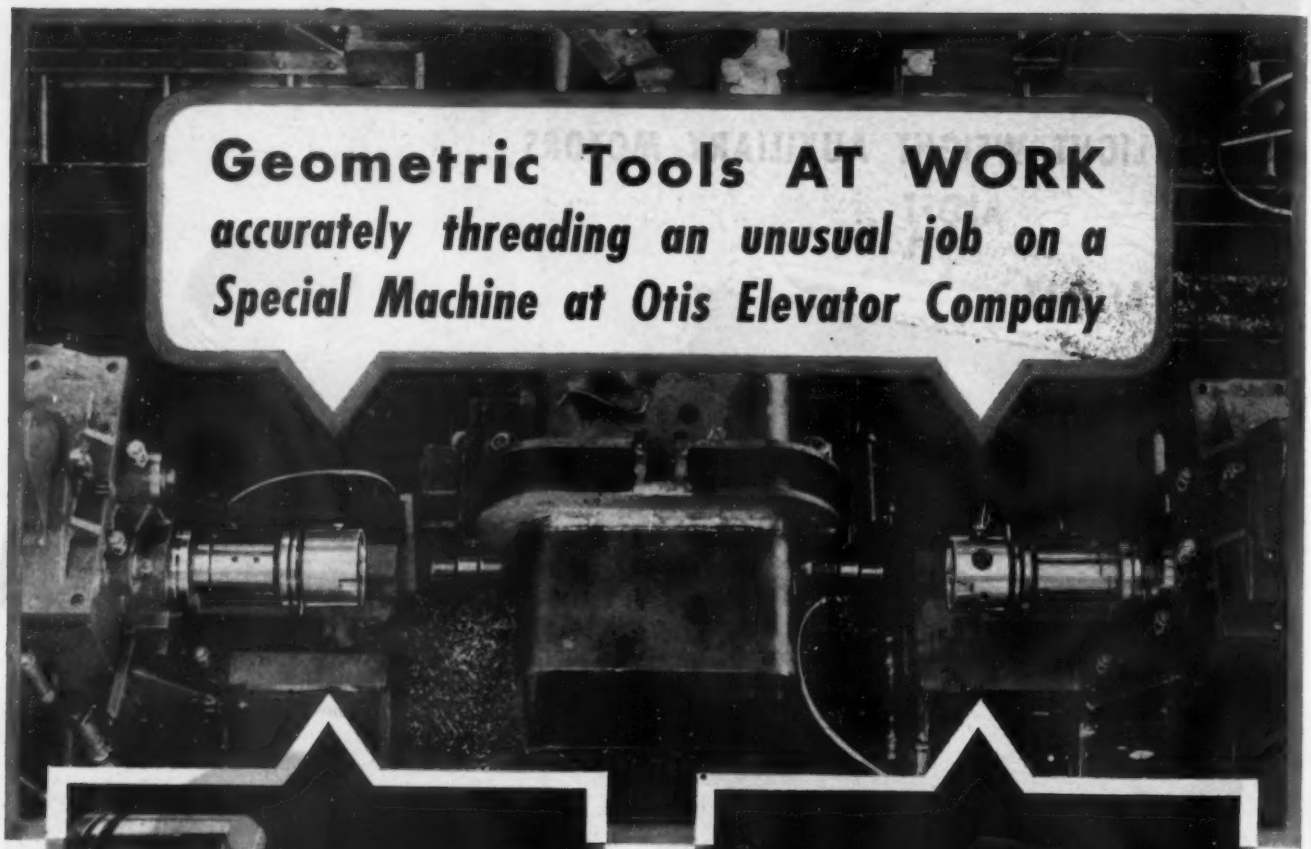
Production speed-up, improved product-quality, are the rule where Brightboy is employed for close-tolerance burring, finishing and polishing. These versatile abrasives, made for both manual and machine operations, eliminate the production steps between the grind and the buff and frequently produce the final polish. Brightboy's original rubber and abrasive formula gives results faster and better.

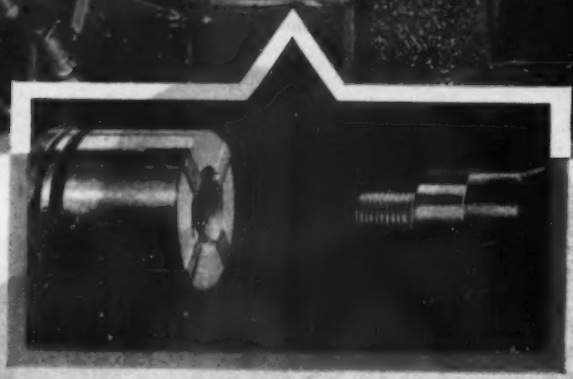
Ask your dealer for Brightboy — and for catalog, price list and production literature. Brightboy dealer representatives and service men will be glad to work with you on your production problems.

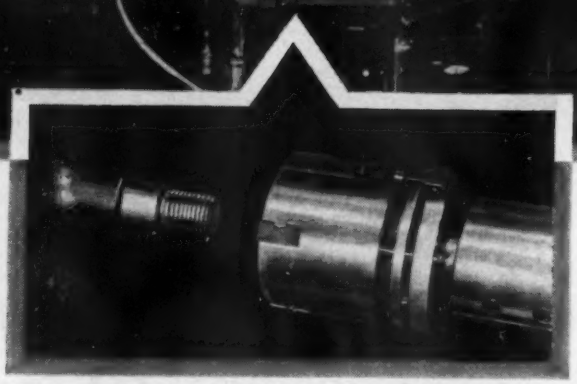
BRIGHTBOY INDUSTRIAL DIVISION
Weldon Roberts Rubber Company
Newark 7, New Jersey

WELDON ROBERTS
Brightboy

Geometric Tools AT WORK
accurately threading an unusual job on a Special Machine at Otis Elevator Company







THE GEOMETRIC STYLE DD DIE HEADS on this job are used in the production of 155 MM Recoil Mechanisms for the famous "Long Tom" Gun. The cradle of this mechanism is 33" wide, 27" high and 112" long. The machine on which die heads are used is one specially designed by the Otis Elevator Company and located at its Harrison, N. J., plant and its construction is such that two threads can be cut simultaneously. Size of thread is 1½"—6NC2; the material is Steel WD-4130.

This threading operation is done after approximately 100 hours of welding have already been performed and also a considerable number of machine tool hours. The parts being threaded have been welded to other component parts of the cradle. Thus it is important that the threading operations be accurate and fool-proof in order to eliminate any chance of spoiling work already done. The accurate performance of Geometric Die Heads, therefore, assures against spoilage and waste of manpower and vital war materials.

This interesting example of Geometric tools at work is another demonstration of the outstanding performance of Geometric Die Heads. Production on this job is fast and threads are held well within the close tolerances specified.

Your threading problem, too, can be solved with Geometric's help.

THE GEOMETRIC TOOL COMPANY
NEW HAVEN 15, CONN.
Machinery and Tools for Cutting Screw THREADS

LAKE SHORE TOOLS
•
HIGH SPEED
AND CARBIDE
NEW!
WRITE FOR
YOUR COPY!
Your request on your company letterhead will bring this new Lake Shore Tool Catalog to you.
Inquiries are invited from responsible Jobbers and Distributors interested in sales of standard Lake Shore Tools.

Back of every Lake Shore Tool are the facilities and skilled personnel of one of America's most completely equipped plants.

LAKE SHORE
TOOL WORKS INC.

Send us your blue prints for quotations on your high speed tool, special tool, and carbide production tool requirements.

816 NORTH KOSTNER AVENUE • CHICAGO 51, ILLINOIS

STRIPS OFF Dirty Film

SUN SPIRITS

speeds up drying rate . . . eliminates greasy film on parts

Army Ordnance specifications are tough . . . and they should be . . . because victory depends on the supplies and materials going to our fighting men. That's why one plant, packaging war parts, decided to change solvents in their metal cleaning operations.

Delays in production had caused a sharp decline in the number of pieces packed per day. Troublesome oily films slowed up progress . . . necessitated long intervals of drying time between the washing and rust preventative applications. They were not able to meet required standards.

Troubles were eliminated, after switching to Sun Mineral Spirits. Its high volatility speeded up the rate of drying . . . stepped up production and output. Oily films are now nonexistant . . . parts are cleaned thoroughly and efficiently.

You can profit, likewise, by cleaning with Sun Spirits in your plant. It's fast . . . requires no mixing or heating . . . is always ready for instant use. For more factual information, write for your free copy of "Case Histories of Cleaning Up War Parts."

SUN OIL COMPANY • Philadelphia 3, Pa.

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

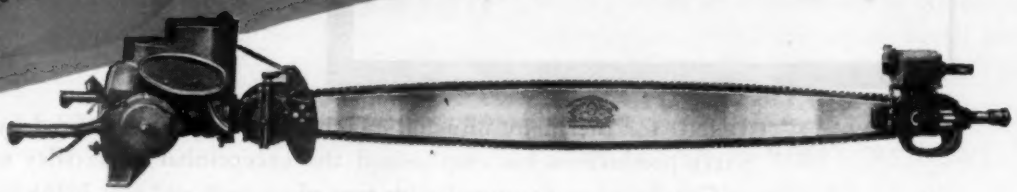
SUNOCO **SUN INDUSTRIAL PRODUCTS**

HELPING INDUSTRY HELP AMERICA

The most revolutionary saw developed in years!

The
DISSTON-MERCURY
GASOLINE DRIVEN CHAIN SAW

Disston Power Driven Chain Saws also are supplied for pneumatic power. Effectively and economically used in shipyards, by railroads, on construction jobs, etc.



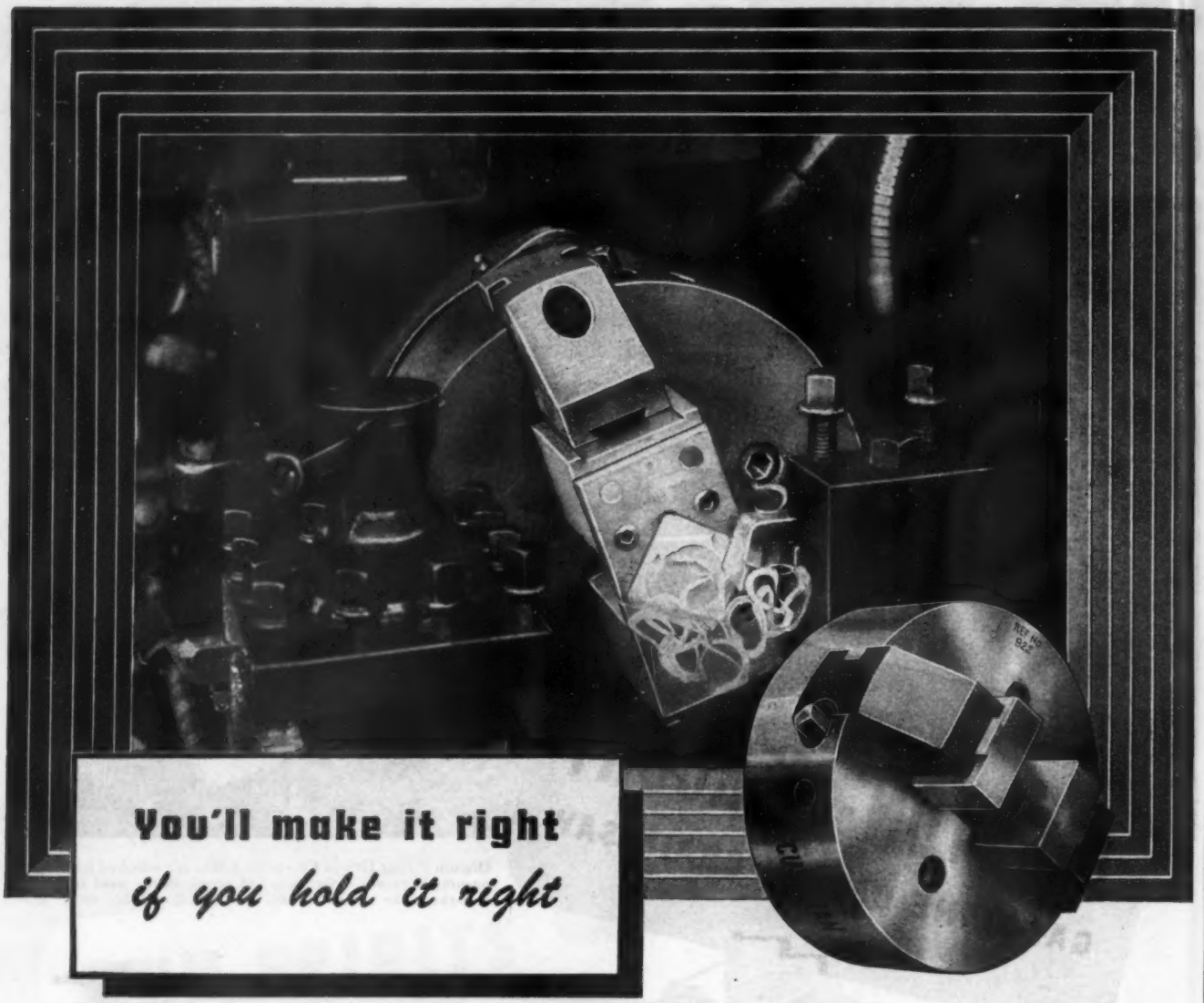
• A contribution of vast importance to the logging industry! That's what timbermen are saying about this Disston-Mercury Gasoline Driven Chain Saw. A well-deserved tribute, for its speed in felling and bucking is almost uncanny . . . enabling one crew to do the work of 20 men using cross-cut saws!

The Disston-Mercury takes all kinds of timber in its stride . . . softwoods and hardwoods. It is sturdily built, easily handled, and may be taken wherever a man can walk. And it comes at an opportune time—when the manpower shortage is acute and lumber scarce . . . a scarcity that may remain as great when the expected post-war building boom gets under way.

With Disston-Mercury Gasoline Driven Chain Saws on the job, production will get a big boost, and precious man-minutes will be saved. For further particulars, write to Henry Disston & Sons, Inc., 920 Tacony, Philadelphia 35, Pa., U. S. A.

DISSTON

Conserve Man-Minutes and help win the war



You'll make it right
if you hold it right

TOOLING for the many unusual machine problems presented by ordnance parts production has emphasized the exceptional versatility of standard Cushman Chucks when equipped with two piece jaws and soft blank top jaws, or with slip jaws, as in the case of the chuck shown above. It is an easy matter to machine such jaws to efficiently and safely hold odd shaped work pieces. When the nature of the work to be handled changes, it is only necessary to change the top jaws or slip jaws for the new piece. In many cases such a procedure saves the time and cost involved in making special face plates, jigs or fixtures. Chuck bodies can be used for a wide variety of tooling set-ups.

If you have a work holding problem in your present production or are now planning tooling for future production, we suggest that you consult the Cushman Engineering Department. Write to The Cushman Chuck Co., Hartford 1, Conn., U.S.A.

A WORLD STANDARD FOR PRECISION

CUSHMAN CHUCKS

Park NO-CARB PREVENTS

CARBURIZATION

No-Carb prevents carburization in selected areas when applied to clean surfaces of low-carbon steels.

DECARBURIZATION

No-Carb prevents decarburization when used on finished high-speed tools, or on bars or billets of high-speed steel.

CAN BE APPLIED BY:

BRUSHING

SPRAYING

Park's No-Carb prevents undesired carburization and decarburization when applied with brush or spray gun on clean metal surfaces.

There is a definite advantage in using No-Carb, because on most jobs it can be applied by brushing or spraying directly from the can after stirring—there is no time wasted in adding to or diluting No-Carb.

No-Carb is removed from bars and billets by the rolling mill, while sand blasting or immersion in a boiling solution of ammonium bifluoride (10-50%), in a wood, or lead or copper lined, tank will remove No-Carb from finished parts or tools. If you are looking for a liquid paint to do a better job of preventing carburization or decarburization it will pay you to try Park's No-Carb—a sample will be sent to you upon request.

SPECIALISTS IN HEAT TREATING MATERIALS FOR 32 YEARS

For 32 years the Park Chemical Company has been specializing in the manufacture of heat treating materials. Today Park's Laboratory Controlled Products are recognized for high quality by manufacturers who demand the best results in their heat treating departments.

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● Liquid and Solid Carburizers ☆ Cyanide, Neutral and High Speed Steel Salts ☆ Lead Pot Carbon ☆ Charcoal ☆ Coke ☆ No Carb. ☆ Carbon Preventer ☆ Quenching and Tempering Oils ☆ Drawing Salts ☆ Metal Cleaners ☆ Liquid Grain Cement

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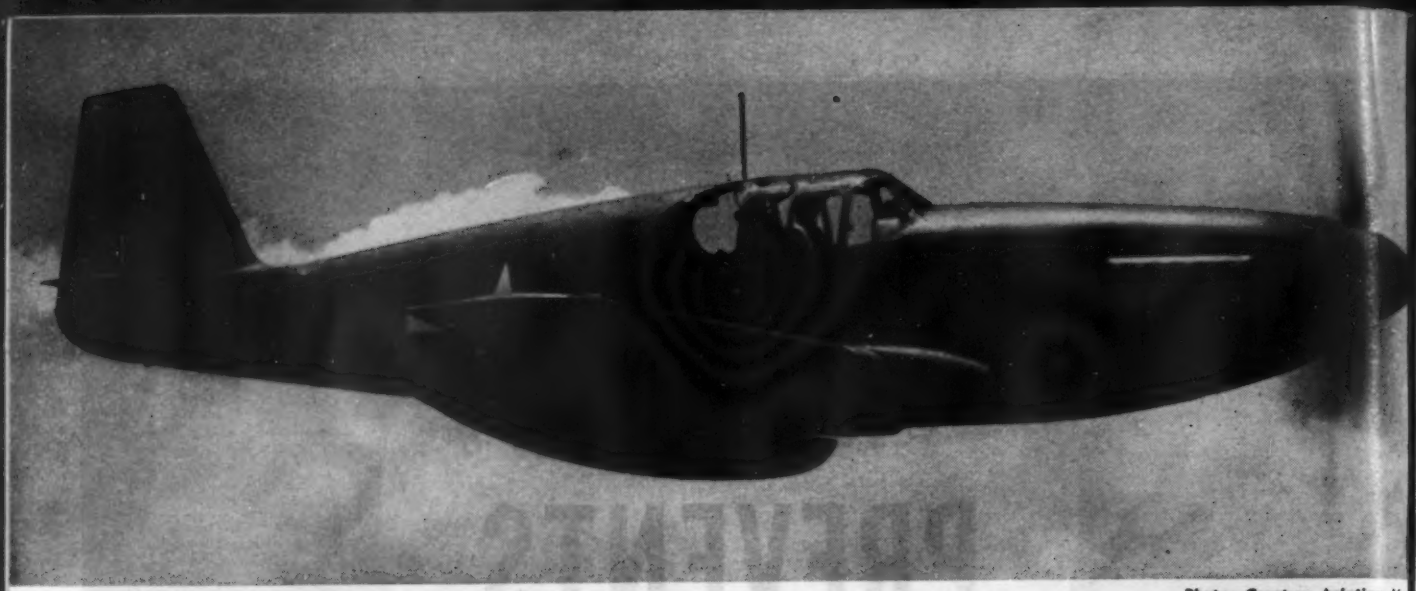

Photo—Courtesy Aviation Ma

'SETTING STUDS IN AIRCRAFT ENGINES with MODERN SELF-OPENING STUD SETTERS

Many aircraft engine builders are setting studs by the slow and costly hand method and have kept away from setting studs by power.

●

Packard are now using power and the Modern Stud Setter for driving 1/4" and 5/16" — studs in the upper crankcase of the Packard Rolls Royce Engine, which results in great saving in the cost of driving studs.

●

Full information on the Modern Stud Setter will be sent on request.

MODERN TOOL WORKS

DIVISION OF
CONSOLIDATED MACHINE TOOL CORPORATION
ROCHESTER 10, NEW YORK

VARD JOHN-SONS
SNAP GAGE

This is an exploded view of a VARD precision thread gage. This gage can explode your inspection costs if you are still checking external threads with a pair of ring gages.

In one quick operation, threaded work on the bench or in the machine can be gaged for lead, thread form, pitch diameter, straightness and roundness.

Correctly cut threads pass through the GO rolls—are stopped by the NO GO rolls.

Write for literature today.

CHECK EITHER RIGHT OR LEFT HAND THREADS WITH THE SAME GAGE.

- Rotating rolls reduce wear.
- Eccentric pins permit adjustment.
- Meehanite, hand fitting frame.
- Open end gage frame permits checking threads to a shoulder.
- Lock nuts secure gage setting.

VARD JOHN-SONS ROLL THREAD SNAP GAGES ARE MADE IN SIZES TO GAGE WORK FROM NO. 0 TO 12-IN. DIAMETER, AND IN ALL STANDARD THREAD FORMS.

ARMY ★ (E) ★ NAVY

VARD INC.

PASADENA 8, CALIF.

QUADRO *Precision* LIVE CENTERS

Manufactured in all tapers and sizes.

•

Write for Circular.

FOUR ROWS OF PRECISION BALL BEARINGS

QUADRO LIVE CENTERS combine the rigidity of the solid lathe center with the frictionless properties of the ball bearing to form a tool which will increase production without sacrificing accuracy.

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ERRINGTON MECHANICAL LABORATORY

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MULTIPLE HEADS

Super-Sensitive Fixed Center Multiple Drilling Heads

Fixed-Center Auto-Reverse Multiple Tapping Heads

All Parts Fully Enclosed to Insure Pressure Lubrication and Rigid Support of Adjustable Spindles

ADJUSTABLE MULTIPLE SPINDLE DRILLING HEAD

Step up Efficiency with the H. & H. 6-TOOL TURRET HEAD

Converts any engine or speed lathe into a turret lathe. Standard Arbors for mounting on tailstock furnished.

Made in 3 sizes (overall-diameters): 3¼", 3½" and 5¼".

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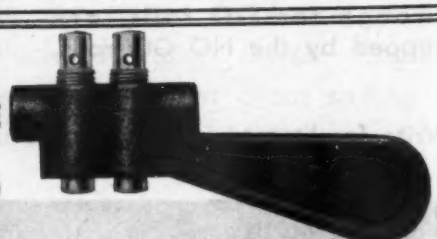
H. & H. MACHINE TOOL CO., Waltham, Mass.

NEW EDDY ADJUSTABLE INSIDE (Go, No Go) GAGES



Replace: Plug Gages—Size Blocks—Telescoping Gages Spring Calipers—Planer Gages—Keyway Gages

Sizes to gage from 1" to 12"

So easy to set that they are practical to use on a single piece. Can be sealed for the larger production jobs.

Are rigid and cannot easily change as spring calipers do. Can be used to gage the taper and diameter of a tapered hole. Can be set to micrometers, ring gages, verniers or work samples.

Also have many other uses — Send for further information.

EDDY MANUFACTURING CO.

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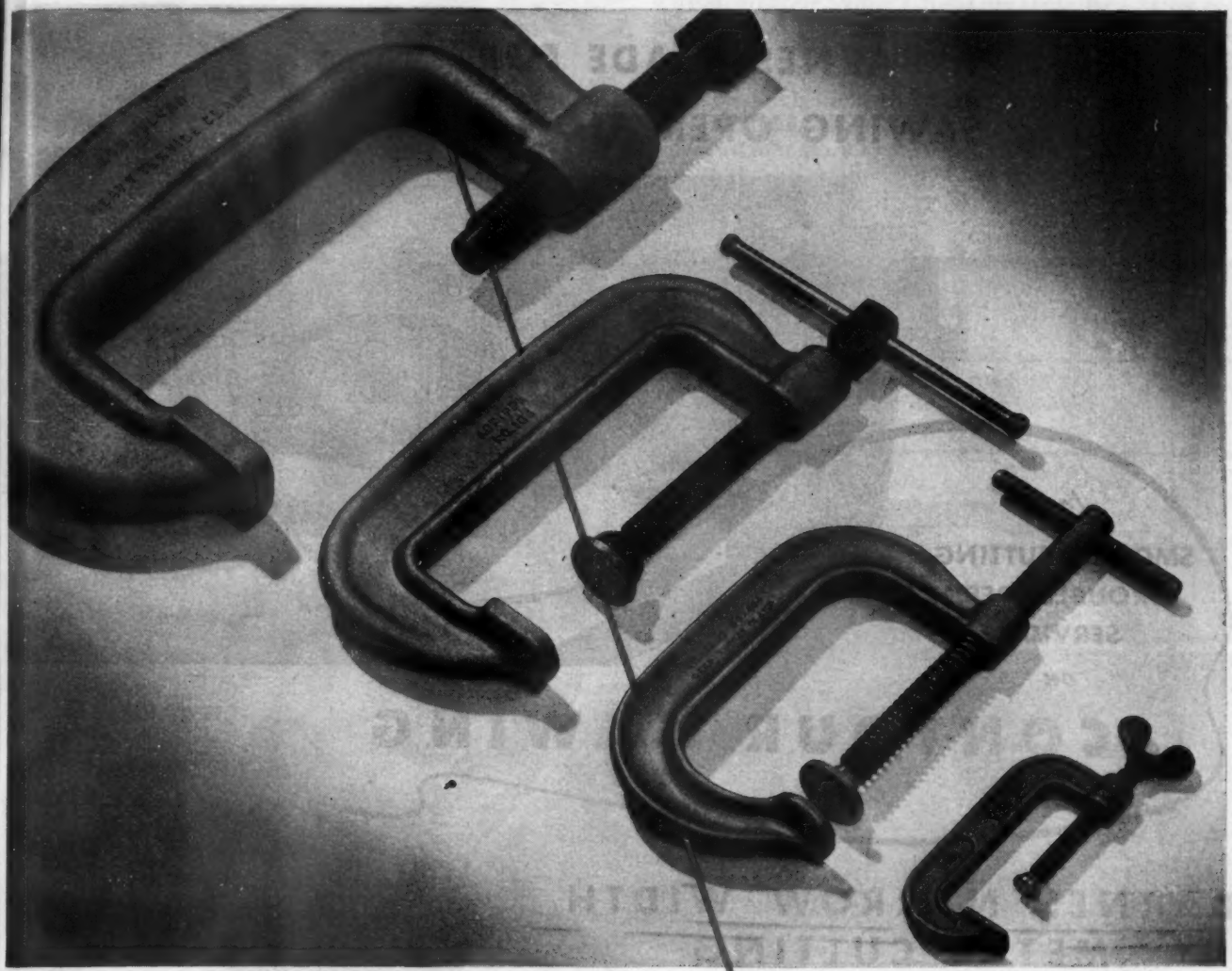

To Build Better... Faster

American Industry has long since learned that the better the tool, the greater the productive skill. The exigencies of war production have demonstrated this truth; competition for postwar markets will reiterate its wisdom. Williams will continue to supply tools with which to build better... faster.
J. H. Williams & Co., Buffalo 7, N.Y.

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DROP-FORGINGS AND DROP-FORGED TOOLS

THERE IS A BARNES BLADE FOR *Every* SAWING OPERATION

for
SMOOTH-CUTTING
TROUBLE-FREE
SERVICE
on

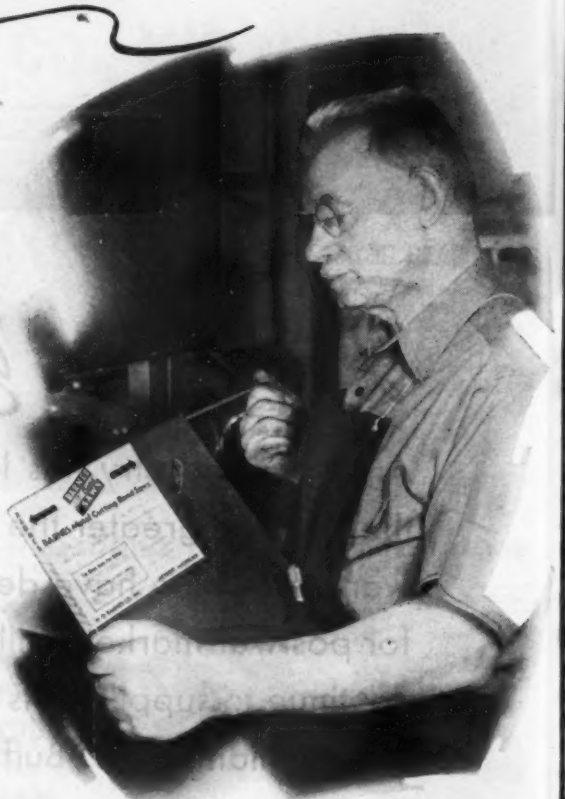
CONTOUR SAWING

BARNES NARROW WIDTH METAL CUTTING BAND SAWS

In contour sawing, Barnes Narrow Width Band Saws always provide consistently efficient performance. Their accurately milled and uniformly hardened teeth provide the smooth cut required in this type of work.

SUPPLIED IN HANDY TANGLE-PROOF CARTON WITH "QUICK INVENTORY" RECORD

Barnes Narrow Width Band Saws are shipped in 100 ft. coils in a carton which not only permits quick and easy removal of required lengths but also provides a "quick inventory" method of recording the amount of stock used. The band saw is loosely coiled, eliminating checks, yet it is confined so that it never tangles.



FOR FULL INFORMATION ON THESE AND OTHER BARNES BLADES, SEE YOUR BARNES DISTRIBUTOR . . . IF YOU'RE FACED WITH A METAL SAWING PROBLEM, THE SERVICES OF A FACTORY-TRAINED BARNES SERVICE ENGINEER ARE AT YOUR DISPOSAL.

W. O. BARNES CO., INC.

1919 - 1944

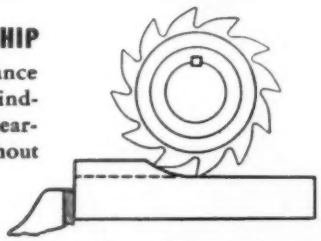
DETROIT 14, MICHIGAN

TWENTY-FIFTH ANNIVERSARY

5 TIMES FASTER— Was I Convinced!

"When I heard about the Por-os-way wheel I decided to give it a whirl, grinding Stellite J Metal ray blades for a facing cutter. That's a tough assignment, but Por-os-way ate it up. Now I take .015" cuts without glazing or burning and get 500% more production. Naturally that means about 5 times lower production costs." Equal or even better results may come your way if you'll forget conventional feeds and depths of cuts and push the Por-os-way wheel on your work to the very limit of its possibilities. Send for the Por-os-way booklet "Facts About Por-os-way"—with the prescription blank. Try Por-os-way—severely—and see for yourself.

-OS-WAY GIVES YOU CHIP ARANCE—See that clearance milling cutter? Tiny grind- wheel edges need chip clear- to remove material without rference. Por-os-way's ual structure provides clearance NATURALLY, ed by long, curling chips, and evidenced by greatly ced dressing.



S MAKES THE DIFFERENCE

can spot the difference between an ordinary el (top) and a Por-os-way wheel (bottom) the naked eye. The extra porosity of Por-os- is the reason for more than 8 distinct operat- dvantages.

heel that Costs the Most at First—Costs the Least at Last

Many users report use of the same Por-os-way wheel for rough grinding as selected for precision finishing. It saves time wasted on wheel changes and extra finishing operations. Eliminates a "special" finish wheel. Try Por-os-way both ways!

The List of Por-os-way Users Reads Like a Blue Book of American Industry, Included are:

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O 5 TIMES ER GRINDING COSTS

RADIAC*

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POR-OS-WAY*

A. P. DE SANNO & SON, INC., 430 Wheatland St., Phoenixville, Pa., Since 1893

NEW YORK, PITTSBURGH, CLEVELAND, DETROIT, CHICAGO, LOS ANGELES

Radiac POR-OS-WAY • Radiac PARAFLEX • Radiac Mounted Points and Mounted Wheels Radiac Internal Grinding Wheels • Radiac Abrasive Cut-Off Machines and Discs

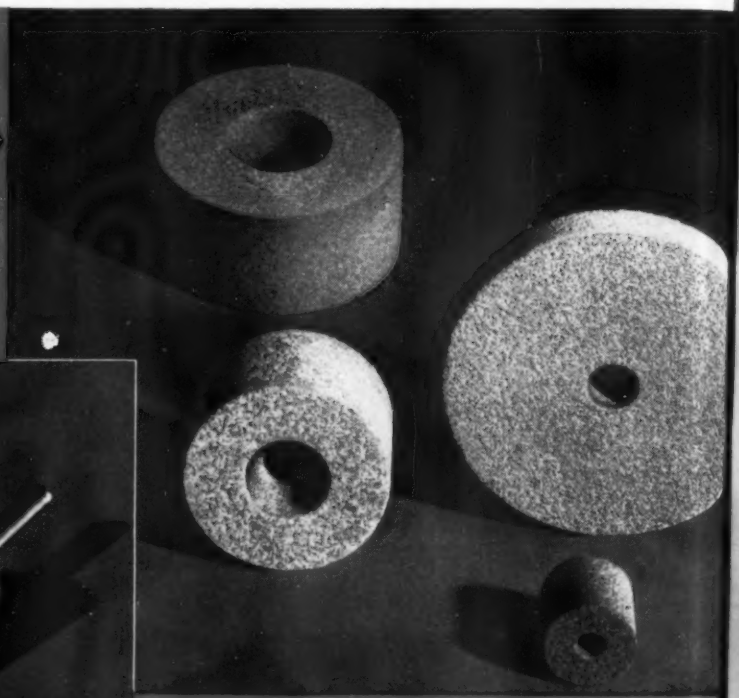
RADIAC*

SPECIAL SERVICE ASSURES YOU THE RIGHT MOUNTED POINT, MOUNTED WHEEL AND INTERNAL GRINDING WHEEL EVERY TIME

Radiac wheels are specially "prescribed" for each job you have. The prescription is individually "custom-compounded" by hand. Then the prescription is recorded at our plant to insure promptly and precisely filled reorders. You get the right Radiac wheel for your work...and right every time! Write for booklet with complete details on Internal Grinding Wheels (booklet #1) and Mounted Points (booklet #2).

RADIAC INTERNAL GRINDING WHEELS

All wheels are 100% tested to precision tolerances • Every wheel is a product of pioneers in the development of internal grinding wheels • Radiac Internal Grinding Wheels are available in tough, regular aluminum oxide (brown); in special aluminum oxide (white or red bond) or a special exclusive "Blue Glass" friable bond which permits an increase in the ratio of cutting grain to bond.



RADIAC MOUNTED POINTS AND MOUNTED WHEELS

All wheels and points are dressed and finished ready to use (no finishing, by you necessary) • All kiln glaze is removed • All are 100% tested to precision tolerances • Concentricity is guaranteed • Special Bakelite cement secures wheels to mandrels • Radiac Mounted Points and Mounted Wheels are available in tough, regular aluminum oxide (brown) or in special aluminum oxide (white or red bond) for greater friability.

PIONEERS in the development of mounted points, mounted wheels, and internal grinding wheels.

For Fast Stock Removal, Long Life, Cool Cutting—

RADIAC*

Radiac POR-OS-WAY — Radiac PARAFLEX — Radiac Mounted Points and Mounted Wheels — Radiac Internal Grinding Wheels — Radiac Abrasive Cut-Off Machines and Discs.

*T.M. Reg. U.S. Pat. Off.

A. P. DE SANNO & SON, INC., 430 Wheatland Street, Phoenixville, Penna., Since 1893

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NEW

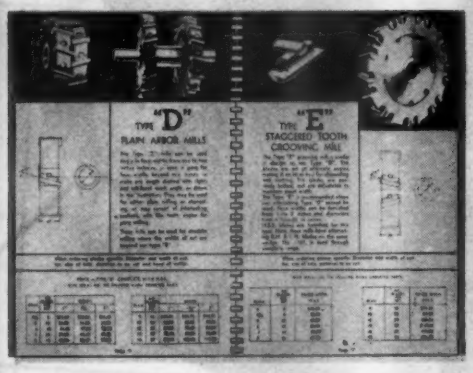
LOVEJOY TOOL CATALOG

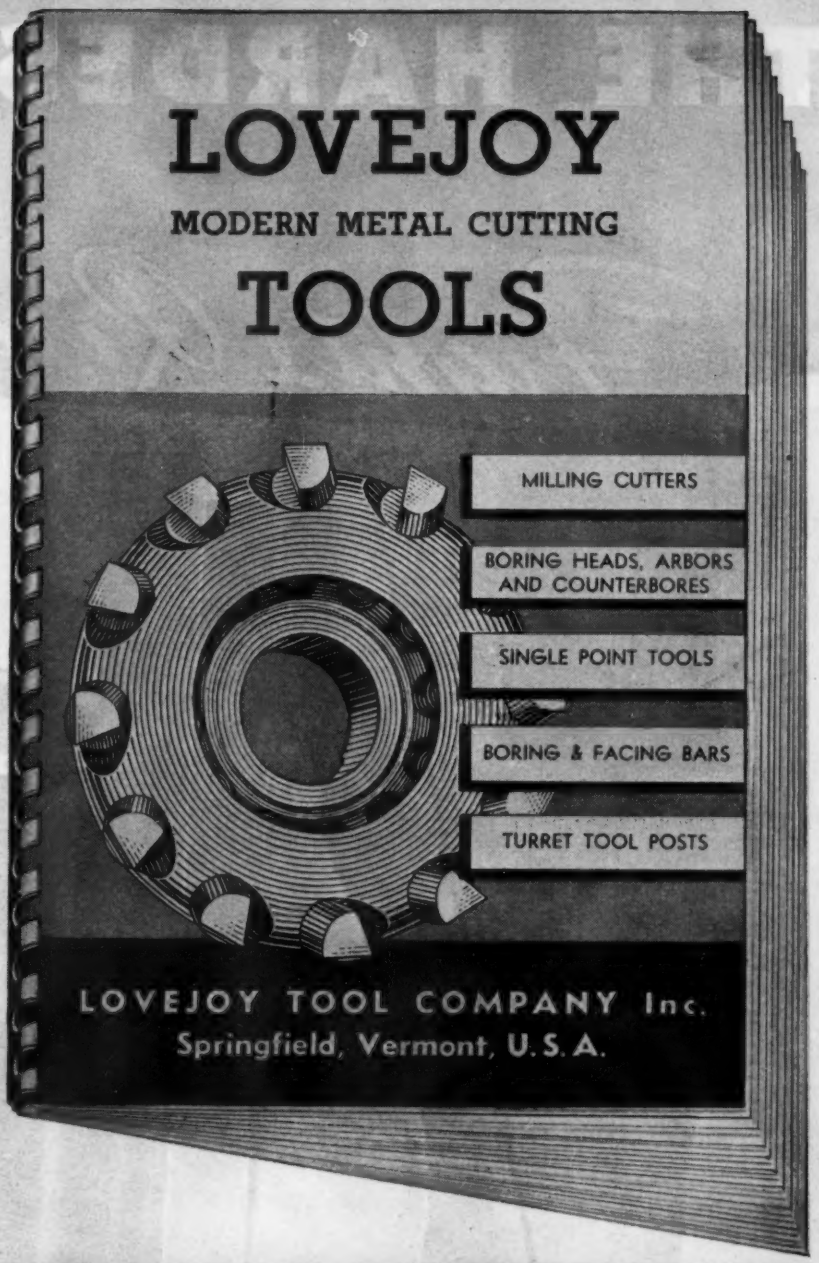
The new Lovejoy Tool Catalog is just off the press—your free copy is waiting for you—it is filled with photos, specifications, line drawings, prices, part numbers, hints on grinding, proper cutting speeds, etc., etc.

It gives *complete* information on *all* Lovejoy inserted-tooth type cutting tools, plus standard arbors and mountings.

Just fill in the handy coupon and mail it today!

There are 38 pages packed with illustrations and information like this!





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Please send me my free copy of "Lovejoy Modern Metal Cutting Tools."

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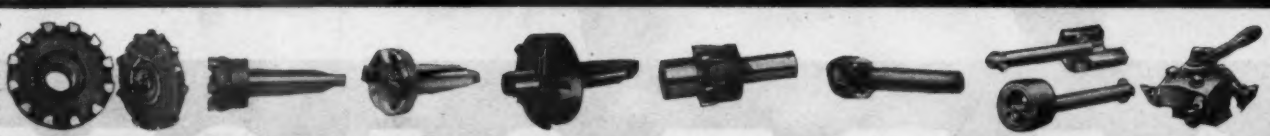
Lovejoy

TOOL COMPANY, Inc., SPRINGFIELD, VT., U.S.A.



MILLING CUTTERS | BORING HEADS | ARBORS | SPOT FACING TOOLS | COUNTERBORES | BORING BARS | SINGLE POINT TOOLS | TURRET TOOL POSTS

THE HARDEST METAL

Fights Rising Costs

CARBOLOY

TRADEMARK

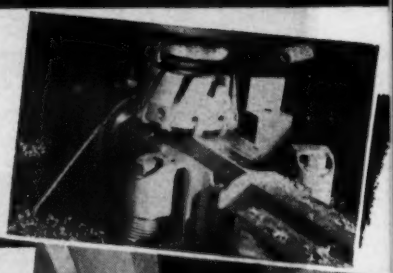
MADE BY MAN . . .

in these 6 Fields of Use

ARE THEY *ALL* IN YOUR POST-WAR PLANS?

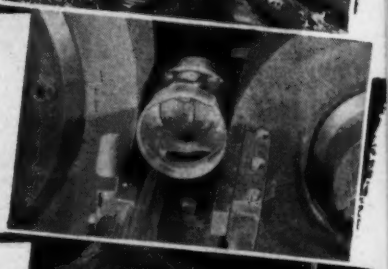
★ METAL CUTTING . . .

As a cutting tool, Carboloy Cemented Carbide slashes product cost by conserving machines, manpower, time and materials, steps up production often as much as 3:1.



★ GRINDING . . .

As matrix for diamond impregnated dressers, Carboloy Cemented Carbide reduces dresser costs, eliminates resetting expense and cuts diamond waste.

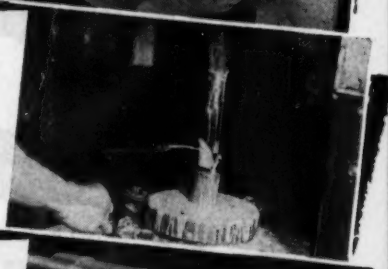


★ INSPECTION . . .

Used on the contact surfaces of all types of gages, Carboloy Cemented Carbide insures dependable accuracy; keeps gages in service as much as 100 times longer than other metals.

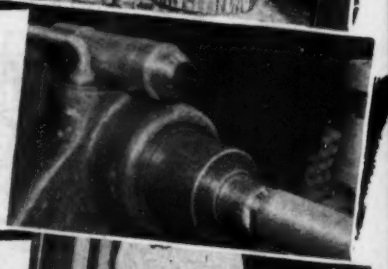
★ PRESS WORKING OF METALS . . .

As a die for drawing and forming metal parts, Carboloy Cemented Carbide produces parts with mirror-like finish and closer tolerances; eliminates frequent rejects; drastically cuts die cost per piece.



★ MACHINE OPERATION . . .

As a means of increasing life of machine parts—such as centers, grinder rests, cams, guides, etc.—Carboloy Cemented Carbide tipped parts eliminate costly tie-ups for replacements and repairs; keep production rolling.



★ PLANT MAINTENANCE . . .

As a masonry drill, Carboloy Cemented Carbide penetrates concrete, brick, tile, incredibly fast; permits quick installation of machinery, wiring, pipes, etc. A valuable reconversion aid.

CARBOLOY COMPANY, INC., 11119 E. 8 Mile Blvd., Detroit 32, Michigan
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PITTSBURGH • THOMASTON, CONN.

NGSTEN CARBIDES ★★

For Cutting CAST IRON and Non-Ferrous Metals | For Cutting STEEL

NGSTEN CARBIDES WITH TANTALUM AND/OR TITANIUM CARBIDES

and . . .
TO "WEAR-PROOF"
The PRODUCTS
YOU SELL!

WITH THESE POWERFUL Thor AIR GRINDERS

...YOU'LL WASTE NO TIME ON GRINDING

To give you top speed for peak production grinding . . . to give you precisely the type of power, light weight, and extreme stamina that make it possible, THOR Air Grinders have these advanced construction features:

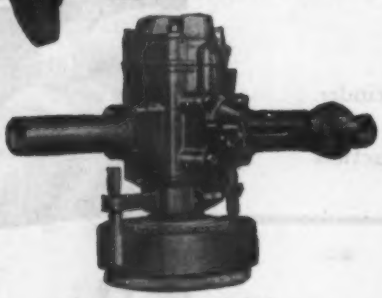
1. THOR "Air Behind the Blades" principle keeps the rotor blades out against the cylinder bushing wall, preventing dead center position and assuring *instant starting* under all operating conditions.
2. The solid one piece construction of the THOR rotor permits the use of deeper blade slots and wider blades. This greatly boosts the power and the rate of material removal.
3. The THOR Double-Acting Safety Governor acts to save time in two ways: It regulates spindle speed to the level of highest grinding efficiency for the size and type of wheel used. It prevents racing of wheels at dangerously high speeds even in event of mechanical failure of governor parts.

You will find these top speed construction features, plus others like THOR End Exhaust, Automatic Lubrication, and Labyrinth Seal on Spindle, in a complete line of THOR Air Grinders for every industrial application. For details, write for THOR Pneumatic Catalog No. 52B.

50 Thor Air Grinders For Every Type Of Job!

Thor Small Wheel Grinders

Thor Radial Wheel Grinders



Thor Surface Grinders

LOOK AT THE RANGE!

Number of Models	50
Wheel Capacities	1½" to 8" dia.
Speeds	3000 to 21,000 RPM
Lengths	5½" to 39"
Weights	18 oz. to 24 lbs.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

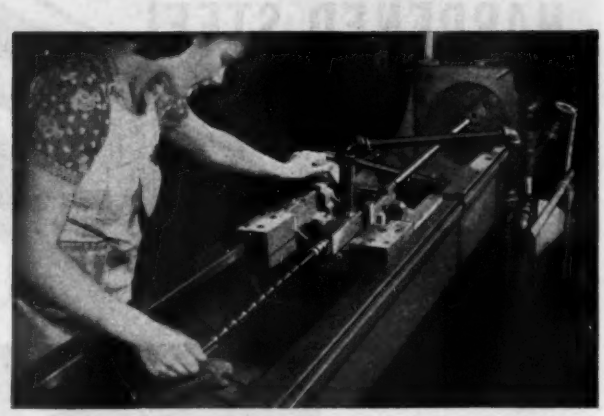
600 W. JACKSON BOULEVARD, CHICAGO, ILL.

Branches in Principal Cities

PROGRESSIVE PLANTS HAVE

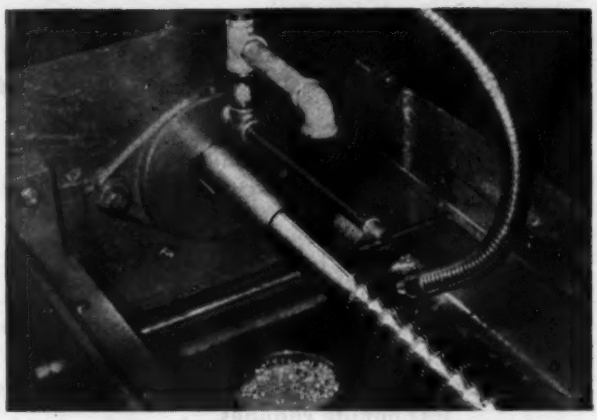
Changed to Broaching

for GREATER ACCURACY



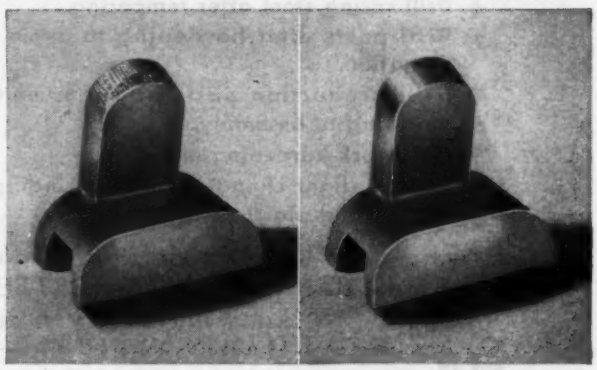
Scrap was reduced 97% when gun barrel rifling was changed over to broaching.

GREATER SPEED



Switching this hydraulic cylinder from boring to broaching cut production time 48½ minutes on one operation alone.

FINER FINISH



The radius on the end of the tongue had been formed by a shaving die. Changing to broaching improved finish and accuracy and entirely eliminated breaking out of the tip under die pressure.

The modern manufacturer cannot afford to overlook the possibilities of broaching. It will cost you nothing to find out how broaching can improve production in *your* plant. Get in touch with the nearest Detroit Broach representative or with either plant and a competent engineer will be glad to give you complete cost and production data without obligation.

BROACHING TOOL

ARMY E NAVY

DETROIT BROACH COMPANY

20201 SHERWOOD AVENUE • DETROIT, MICHIGAN

9308 SANTA MONICA BLVD. • BEVERLY HILLS, CALIFORNIA

NOW YOU CAN DRILL HARDENED STEEL

with "HARDSTEEL" *Drills*

These are just a few of the many uses for "HARDSTEEL" drills — the drills that drill steel hardened by any method without annealing.

1. Drill holes in full hardened dies.
2. Drill holes in armor plate.
3. Remove broken set screws on a drill press.
4. Start holes in case hardened parts.
5. Enlarging holes in hardened parts to accommodate last minute changes.
6. Drill spring steel after tempering.
7. Drill parts after hardening to avoid warping or distortion.
8. Drill production parts after hardening to speed matching at assembly.
9. Drill work-hardening materials.
10. With a slight change in point grinding, drill hard carbon and plastics.

To save time and speed production on dozens of jobs, all you need are a drill press, a "HARDSTEEL" drill and the "know-how" given in detail in the "HARDSTEEL" Operators Manual. It tells recommended speeds, how to grind these drills on an ordinary wheel, when to use coolants, how to use drills for countersinking and counterboring and a wealth of similar information. Write for your copy today.

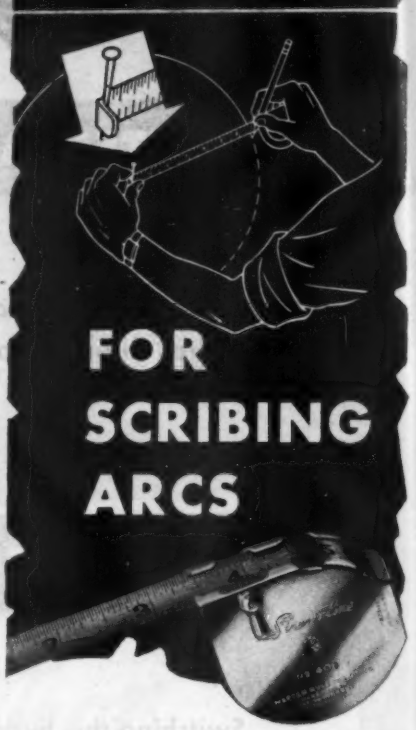
and TOOL TIPS are made of the same special "HARDSTEEL" alloy to speed production when machining tough steels, scale covered forgings and the abrasive copper and light metal alloys.

"YOU HARDEN IT — WE'LL DRILL IT"

BLACK DRILL CO. • Division of BLACK INDUSTRIES
1400 EAST 222nd STREET • CLEVELAND 17, OHIO

"HARDSTEEL"
DRILLS · TOOL BITS · SPECIAL TOOLS

NO. 7 IN A SERIES



FOR SCRIBING ARCS

Here's how you can use Master Streamline steel tape rule in scribing large arcs that no extension compass can perform.

Using a nail or sharp pointed instrument to hold tip of tape at focal point, extend case to desired arc radius. Lock tape with reading at point flush with edge of case nearest lock. Place on work with lever-lock up and rounded side of case toward you. Now, to swing arc, take a pencil, place it at reading point and hold case with other three fingers of hand. The right angle formed by the case and tape holds pencil so that arc is always accurate.

In addition to its use as an arc scriber, this many-purpose rule performs accurately as a height gauge, caliper and inside measuring device. Graduations on all edges of both sides of blade. Complete with easily inserted spare blade.

Branch: 541 S. Spring St. Los Angeles, Calif.

$2.65 each complete with spare blade

MASTER
WOOD AND TAPE RULES

MASTER RULE MFG. CO., INC., Dept. 00
815 E. 136th St., New York 54, N. Y.

Enclosed please find $2.65 for 6 ft. "Streamline" steel tape rule and spare blade.

Name_____

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City_____ State_____

HIGH QUALITY WHEELS FOR EVERY GRINDING PURPOSE

"PROTECT YOUR PRODUCTION"

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago · New York · Detroit · Pittsburgh · Cleveland · Cincinnati · Milwaukee · Philadelphia

AMES

Hundred Series

Shockless

DIAL INDICATORS

4 SIZES
14 DIAL FACES

Ames Dial Indicators have small and accurately made gear trains for indicating size variations as fine as .0001". These highly sensitive gear trains are protected from damaging shocks by a simple shock-absorber which does not change their action or appearance.

Get acquainted with these popular shockless indicators by ordering them with any dial numbering desired.

Complete catalog on request.

B. C. AMES CO.
WALTHAM MASS., U.S.A.

Almond Drill Chuck

The Pioneer

Almond Three-Jaw Drill Chucks were Pioneers in their field—the first to be placed on the market. They have formed a necessary part in the logical procedure of machine developments over the past seventy and more years.

Almond Drill Chucks are made in types and sizes *to fit all machine tools and portable drills.*

Write for complete details

T. R. ALMOND MFG. CO.
ASHBURNHAM, MASS., U. S. A.

The Original Manufacturers of Drill Chucks

The RANDALL & STICKNEY
Dial Test Indicator

A valuable instrument for erectors and inspectors

Especially convenient for checking accuracy in surfaces and spindle movements; also for obtaining comparative measurements on close work and for lining up work on machine tools. Horizontal arm adjustable and can be removed for independent use. With blocks fitted into T slot of base, this R&S indicator can be used against edge of surface plate for checking accuracy of long horizontal surfaces. Dial diameter 2¼", base 3⅛-3¼". Complete details on request.

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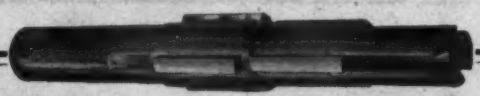

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C	Cr	W	Mo	V
.84	4.15	6.23	5.10	1.85

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C	Cr	W	Mo	V
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C	Cr	W	Mo	V
1.15	4.10	6.15	6.15	3.10

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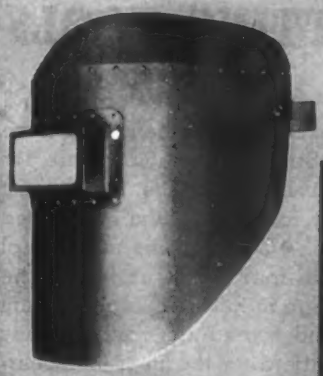
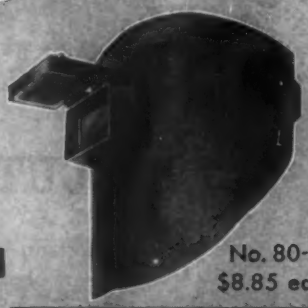
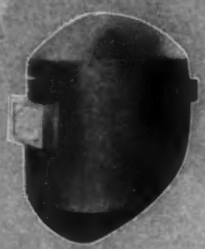
Five Styles—All Sizes



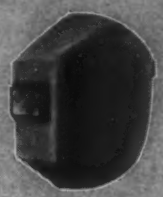
No. 45-A
$6.60 each*



No. 80-A
$8.85 each*



No. 25-A
$7.05 each*



No. 70
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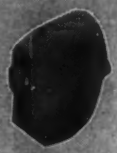

No. 66
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These quality arc welding helmets afford a wide range of selection to meet individual preferences, as follows:

No. 45-A: Strong and leakproof, weighing only 15 oz. without lens. Made of best grade, non-warping, black vulcanized fibre. Adjustable chin rest, free-floating wide range headgear.

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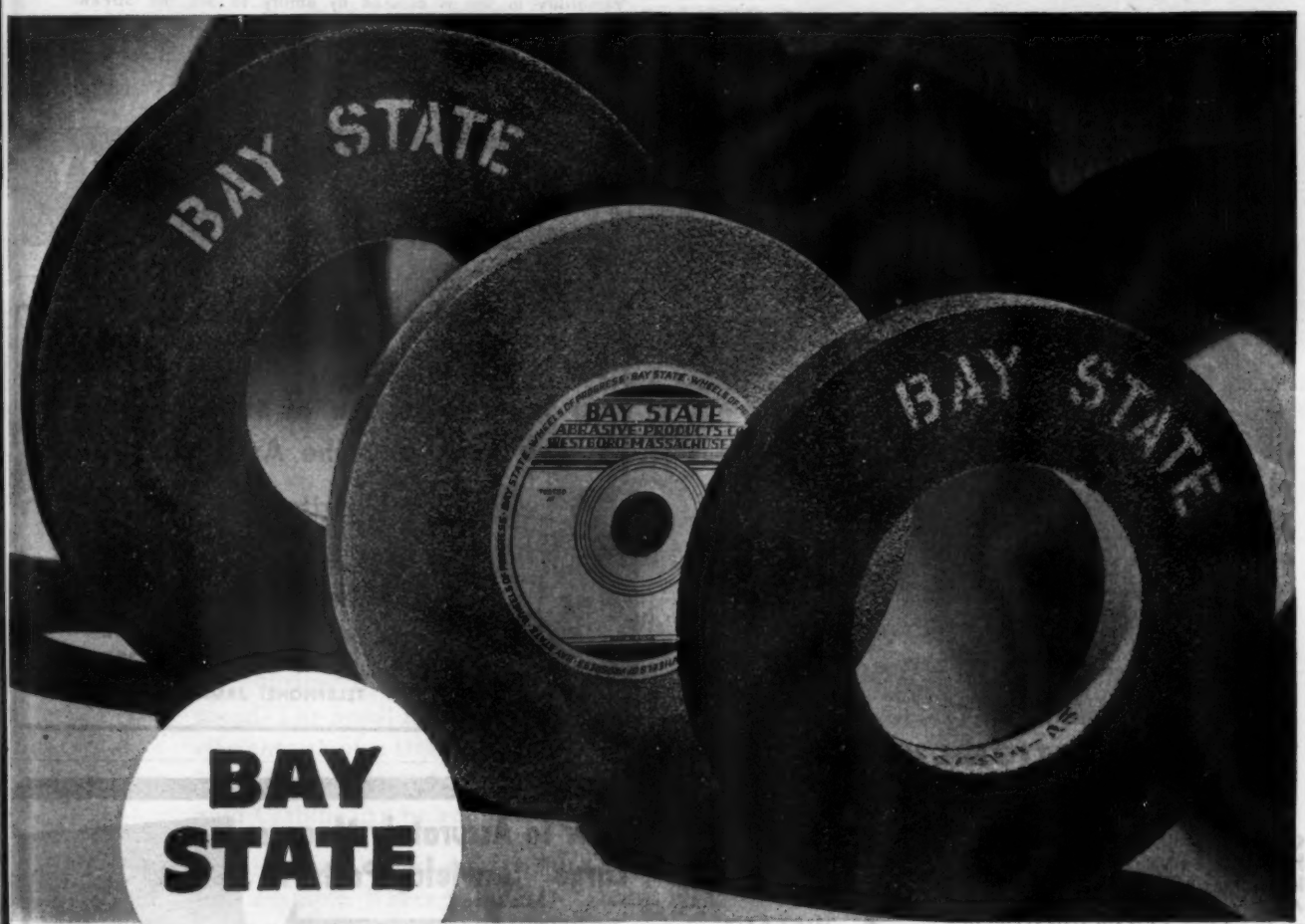

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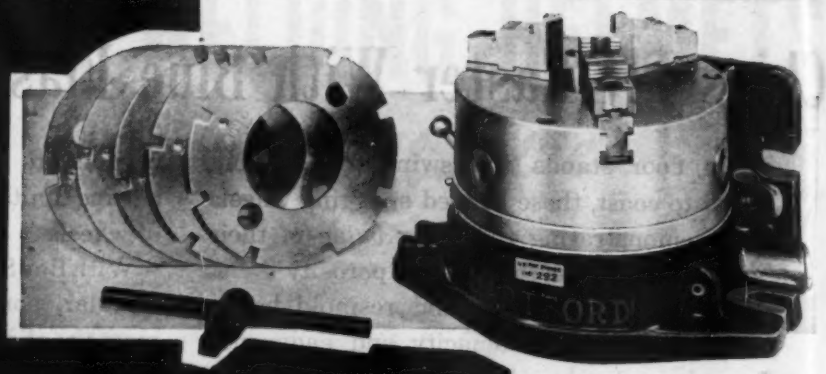
Many jobs can be done faster and at lower cost with HARTFORD SUPER-SPACER



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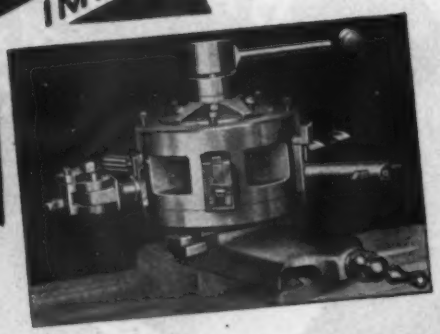

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Teamwork

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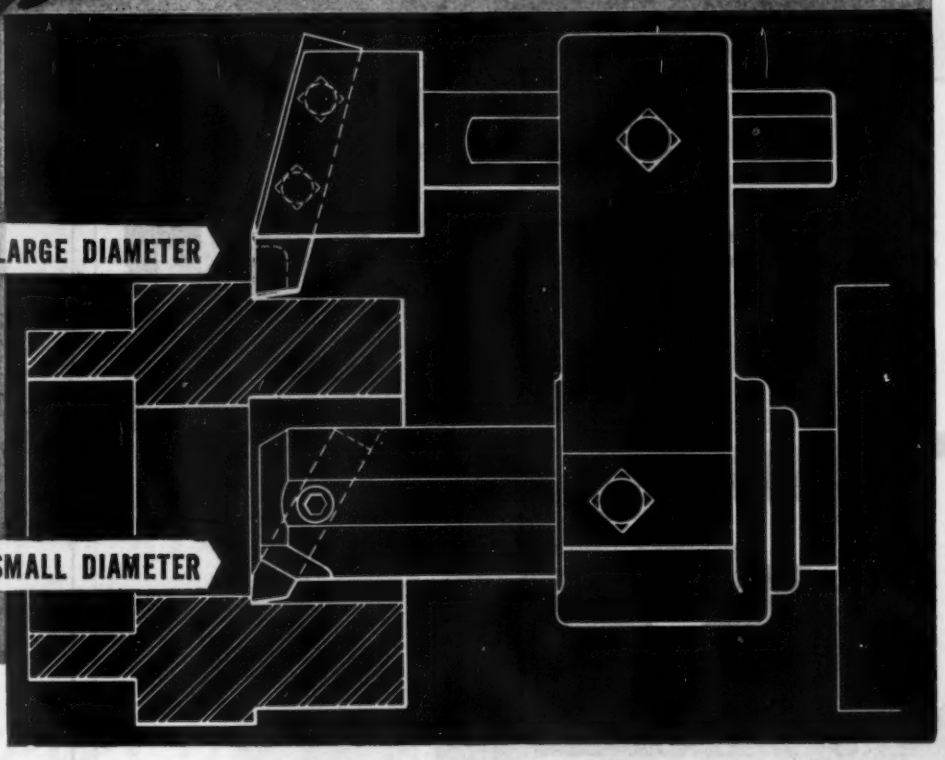
TANTUNG FOR THE SMALL DIAMETER



–on a Turning and Boring Operation

A typical set-up on a W. & S. turret lathe showing Vascoloy-Ramet Tantalum-Tungsten Carbide and Tantung being "teamed together". Boring and turning operations are done simultaneously.

Technical Data:	
R.P.M.	272
S.F.M. in O.D.	320
S.F.M. in I.D.	160

Depth of cut ⅛ inch with .012 feed. Material being cut S.A.E. 1020 steel.

An example of an efficient machine operation teaming Vascoloy-Ramet Tantalum-Tungsten Carbide with Tantung. At 272 R.P.M., the Large Diameter is being machined at the rate of 320 S.F.M., the Small Diameter at the rate of 160 S.F.M.

It is obvious that the Carbide tool has to take the burden of the high perepheral speed. The Small Diameter at 160 S.F.M. is too slow for Carbide and too high for efficient use of a High Speed Steel tool. Tantung filled the gap by replacing High Speed Steel and production skyrocketed. This principle of "Teaming-Up" Tantung with Carbide can be applied to innumerable operations.

Turning gear blanks with smaller diameter hubs and where the diameters vary, is one example where Tantung-Carbide Teamwork pays dividends. Use Tantung when you can't use Carbide.

Ramet

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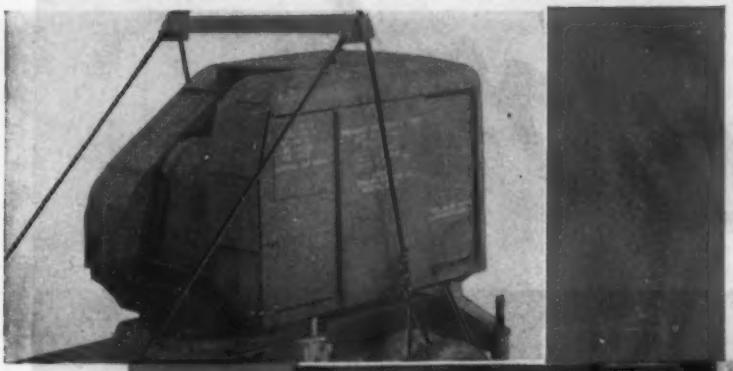

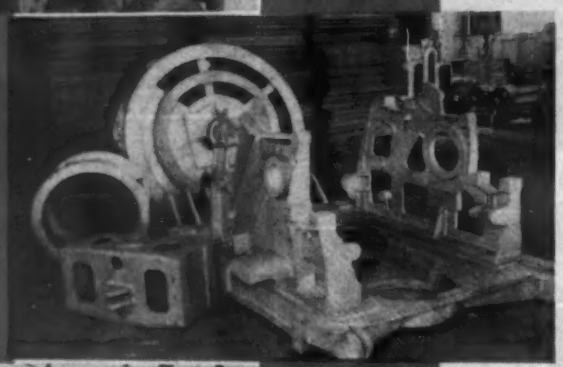

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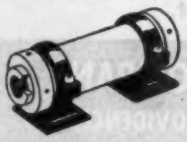

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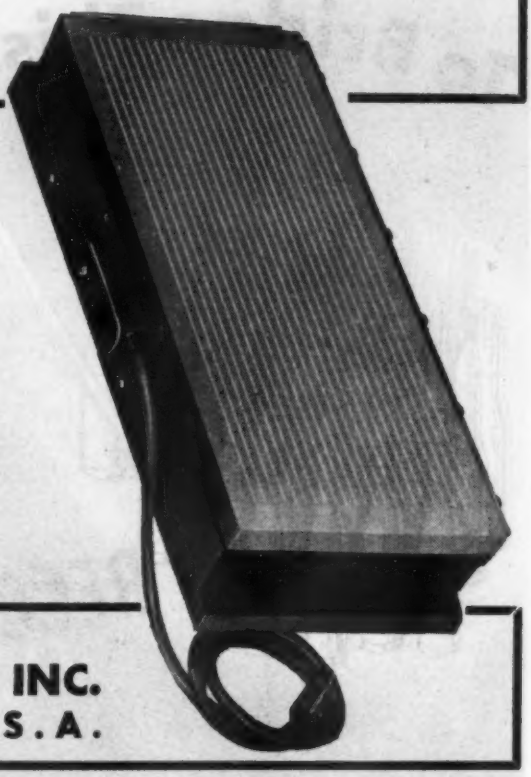
Designers and Builders of Tools, Dies, Jigs, Fixtures and Special Machines

ENGINEERING DIVISION
OF DOMESTIC INDUSTRIES, INC.

Chicago: 510 N. Dearborn Street
Hartford, Conn.: 209 Pearl Street
Springfield, Mass.: 11 Stearns Square

THE NEW LINE OF WALKER
ALL - PURPOSE MAGNETIC - ELECTRIC
LONGITUDINAL POLE CHUCKS



Available for prompt shipment in all sizes from 4"x10" to 12"x60"

In announcing these chucks, WALKER also wishes to call attention to the metal working industry that its line of bar pole chucks has been superseded by this new longitudinal pole type.

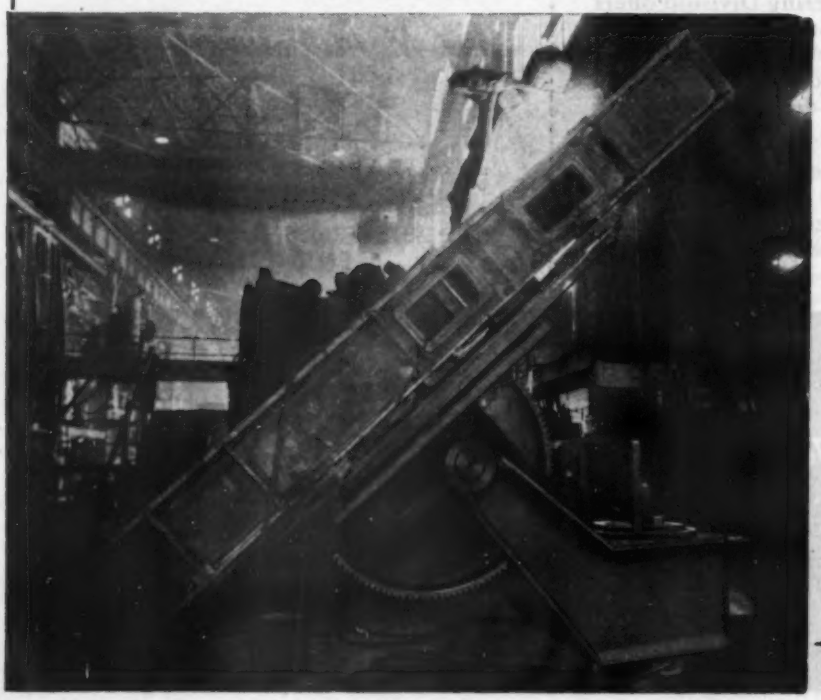
Improvements in the design have resulted in a sturdier chuck that withstands a lot more abuse and which is absolutely waterproof. This new chuck has also proved a more efficient method of holding work. The same fine pole divisions which were a feature of the now outmoded bar pole design are retained in the new line, with all the advantages which this construction has demonstrated.

Send at once for complete detailed information.

O. S. WALKER CO., INC.
WORCESTER, MASS., U.S.A.

C-F POSITIONERS

Handle the BIG JOBS easily and safely!



With C-F Positioners each welder can position even the most cumbersome weldments with a push button control — without crane work or handling crews. He can rotate the weldment a full 360°, rotate it at any speed from 0 R.P.M. up and can tilt it to 135° beyond horizontal . . . can weld all sides, surfaces and angles down-hand with a single set-up; with larger rods and fewer passes. All C-F Positioners, both stationary and portable, are pedestal mounted to give maximum floor and working clearance; all are adjustable for height.

Write for Bulletin WP-22

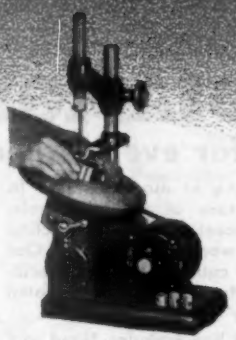
CULLEN - FRIESTEDT CO.
1313 S. Kilbourn Ave., Chicago 23, Ill.

3 JOBS WELL DONE *on the*

ILLINOIS DIE FILING MACHINE

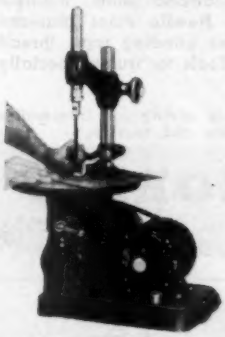
1 - FILING

Designed for filing of intricate die shapes...table can be tilted to right or left up to 20° from horizontal. Hand files can be used.



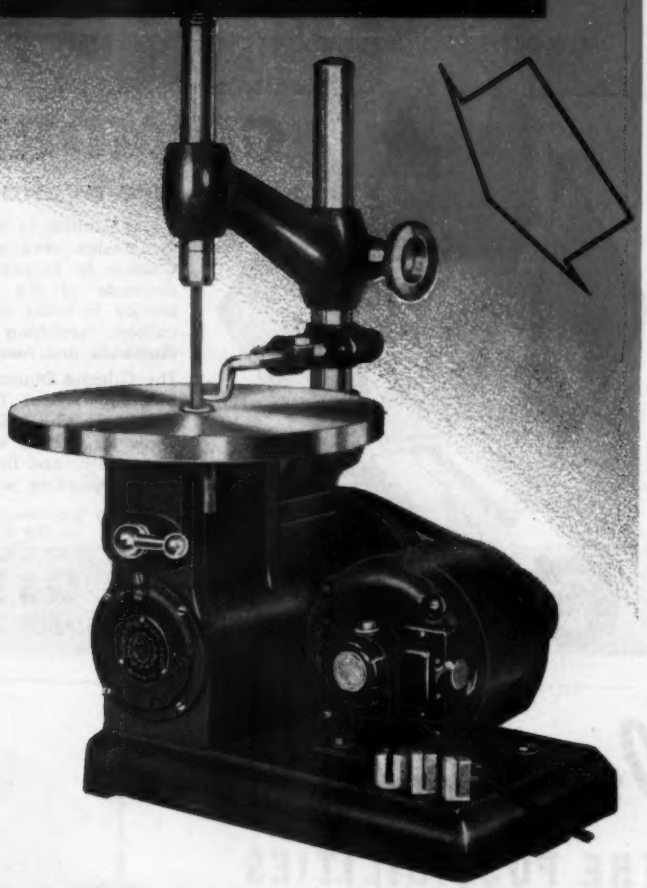
2 - SAWING

The table has a removable ring insert so that shank sizes of saws and files up to 6" length can be accommodated. Saw guide may be utilized as a hold-down finger.



3 - STONING

A finishing stone can be installed easily and quickly — which emphasizes the quality of this versatile machine that performs three major production steps: filing, sawing and stoning.



RAPID AND ACCURATE PERFORMANCE OF CRITICAL FINISHING OPERATIONS

PRECISION and BALANCE mark the Illinois Die Filing Machine which is designed to save time and do a superior job on finishing intricate die shapes. Convenient and adaptable, it is built with extreme precision and durability. Working parts are hardened and ground for accuracy and long life. Automatic forced feed lubrication reduces wear to a minimum. The Illinois Die Filing Machine relieves tedious hand filing of intricate shapes and assures greater accuracy at lower cost. Write for descriptive literature, today!

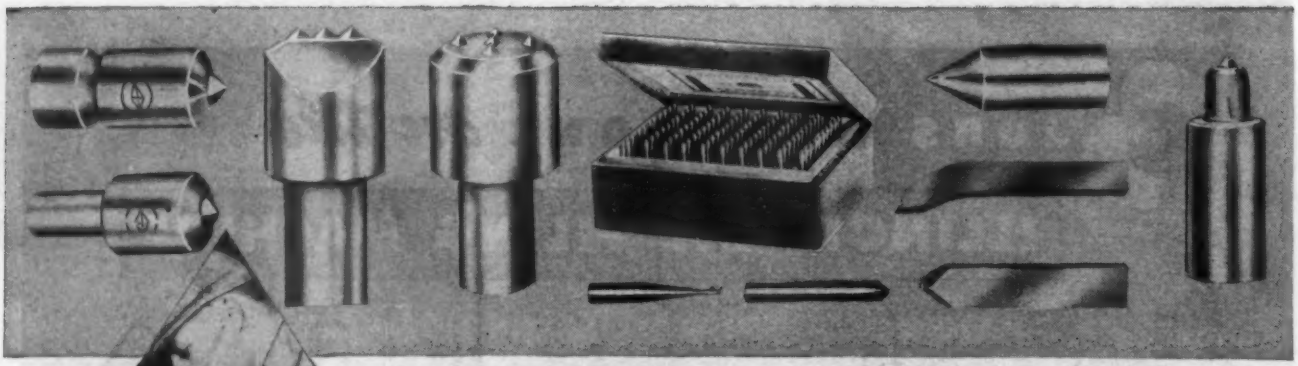
Overnight to All America . . . From the Hub of Air Transportation.

ILLINOIS TOOL WORKS

2501 N. KEELER AVE. CHICAGO 39, ILLINOIS

In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS



GILMORE DIAMOND TOOLS

are available for every wheel truing need

As specialists in the cutting of diamonds and in the design and manufacture of diamond tools, Gilmore is prepared to meet the most exacting demands of the metal working industry. Our service includes diamond cutting to your specifications, furnishing octahedrons, natural elongated diamonds and resetting by experts.

The Gilmore Diamond Tool line includes Hand and Machine Wheel Truing Diamond Tools, Multiple Diamond Wheel Dressers, Needle Point Diamond Tools for use on wheels for grinding taps, thread gages, etc., and Diamond Tools for truing specially formed grinding wheels.

Write for illustrated literature giving full information on the Gilmore line and service.

F. F. GILMORE & CO.
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THE POSSIBILITIES OF THE NATIONAL KEYSEATING MILLER *on Your Work*

• Shops all over the country are solving difficult keyseating problems by chucking this attachment on their drill presses, radials and horizontal boring mills—and milling keyseats in pieces too large or bulky for convenient handling on keyseating machines.

The "National" goes through the hole once and mills keyseats with parallel sides and parallel with the axis of the bore. It's a big time and money saver and is available in standard stock diameters from ½" to 3½" for cutting lengths from 1⅞" to 12". It will keyseat in blind holes, taper holes, and offset holes. We also manufacture oil-grooving millers.

WRITE today for Catalog No. 15

Several widths of cutters can be used with each size miller and many different hole diameters keyseated with one tool through the use of eccentric bushings.

NATIONAL MACHINE TOOL CO.
CINCINNATI, OHIO

Available from Stock

= 0-80 and = 1-72 SCREWS and NUTS

Brass or Steel, Cut Thread Class 3 Fit

Waltham is also equipped to furnish all types of

SPECIAL MACHINE SCREWS and SCREW MACHINE WORK

manufactured to special order.

Write for Catalog and Price List.

WALTHAM SCREW CO.
WALTHAM, MASS.

GOT IT!

AN ADJUSTABLE TOOL HOLDER

ONLY THE CLARK LATHE TOOL HOLDER HAS ALL THESE EXCLUSIVE FEATURES

1. Each Holder accommodates four or more sizes of square or round tool bits.
2. Vise grip jaw rigidly clamps short tool bits.
3. Dual or narrow tool bits are firmly held for cutting-off or special forming operations.
4. Solidly grips and supports carbide bits and boring bars.
5. Vise grip holds bits of brittle alloys more securely without breakage.
6. Tilted position of screw and head provides unobstructed view of work.

CLARK TOOL HOLDER Nº 62-L
DROP FORGED IN U.S.A. PAT. PEND.
Adjustable
Vise Grip jaw gives full bearing for tool bits and even distribution of pressure.

Each individual Clark Tool Holder will accommodate not one but *four* sizes of tool bits.

Made in complete range of shank sizes with standard 15° cutter channel; also parallel type for Carbide cutters and boring bars, in both right and left hand offset.

See Clark Exhibit K-617
National Metal Congress, Cleveland, Ohio
October 16th through 20th

See Your Jobber Now! Or Write For Bulletin — **AM-9**

Robert H. Clark Company

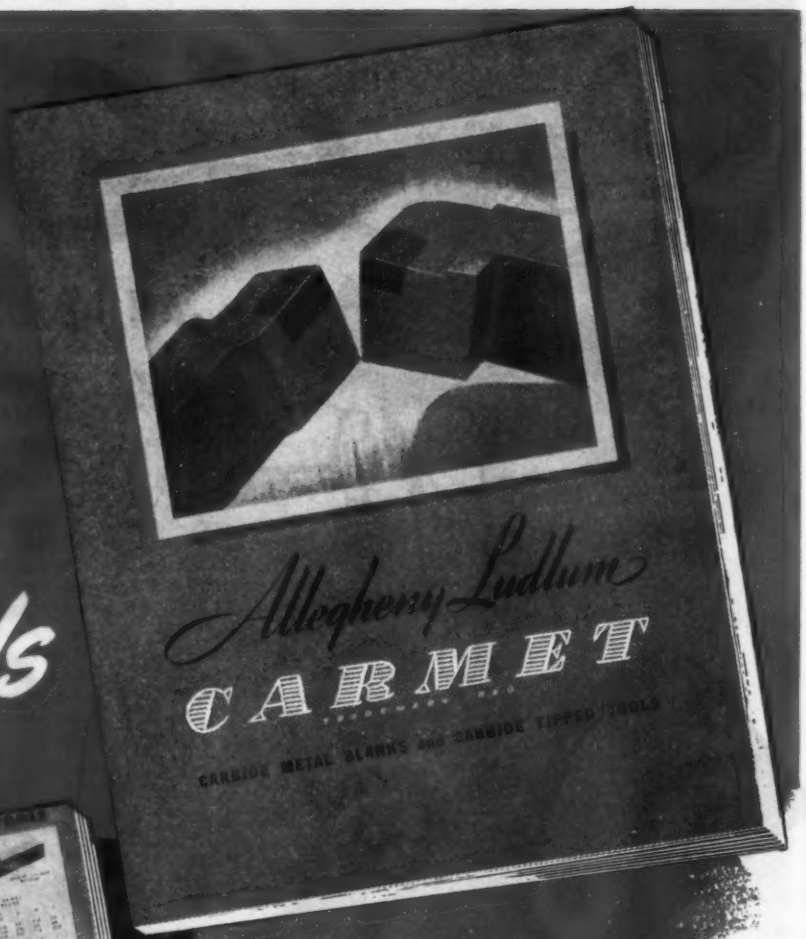
9370 SANTA MONICA BOULEVARD • BEVERLY HILLS

No. P-62-R holding CLARK Boring Bar

An Important Addition

TO OUR LINE OF

Cutting Materials



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Complete information and prices on Carmet Tools and Blanks, data on Tool Shank Steel, etc., in easy-to-follow tabular style.

ADDRESS DEPT. A.M.-30.

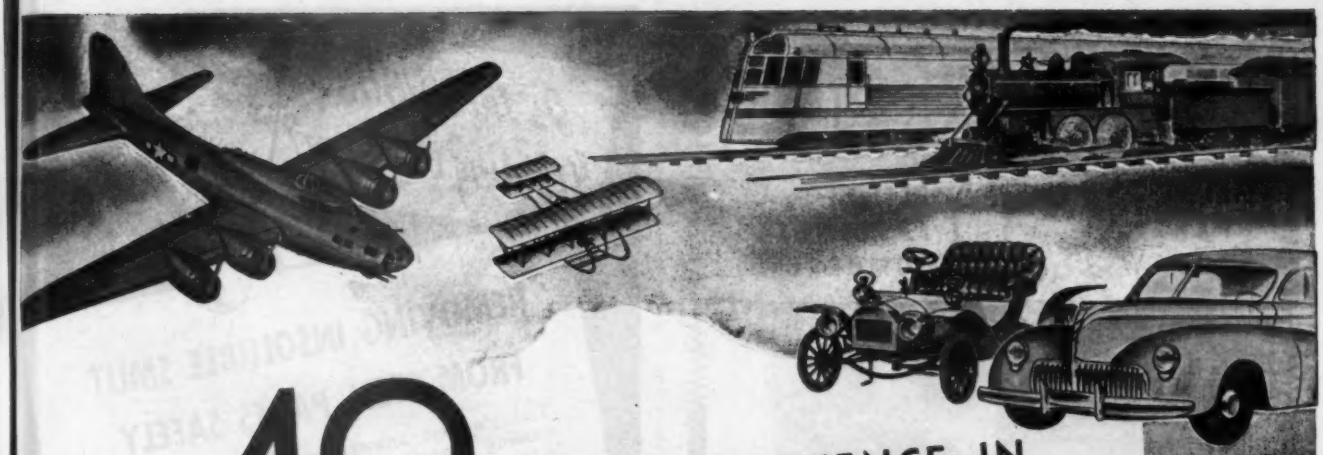
Send for your copy

OUR research work has always been strongly identified with cutting materials. With the various high-tungsten types of High Speed Steels as the starting point, followed by the development of the "moly" types, Allegheny Ludlum technicians later originated the patented DBL low-tungsten analysis of High Speed Steel, which has played a major role in wartime tungsten conservation.

Years earlier, our Laboratories did much basic development work on carbides, when they were first introduced in this country. At that time, we registered the trademark "Carmet." Now, with the re-establishment of our Carbide Manufacturing Division, an advanced and complete line of Carmet carbide-tipped tools and carbide metal blanks is available, thoroughly researched and effectively enhancing Allegheny Ludlum's service to users of cutting materials. We invite your attention and inquiries.

Allegheny Ludlum
STEEL CORPORATION
BRACKENRIDGE, PENNSYLVANIA

W&D 9497



OVER 40 YEARS' EXPERIENCE IN PRECISION-CRAFTSMANSHIP

● Murchey has a record of experience and a tradition in precision-craftsmanship which give it a unique position in American industry.

It is also significant that 35% of Murchey's plant personnel have been Murchey men continuously for ten, fifteen—and even twenty years.

What this means to those industries in which quick, accurate threading is indispensable to quality and to quantity production is strikingly apparent.

Murchey's Self-Opening Die Heads, Collapsible Machine Taps, Thread Milling Machines, Tapping Machines, Bolt and Pipe Threading Machines and other threading tools, are recognized as the standards by which all threading equipment is judged and evaluated.

And when problems arise in which threading is an important element, industries faced with such problems turn invariably to Murchey as the organization best qualified to provide an adequate solution.

It has been a Murchey tradition never to "rest on its oars"—never to become complacent—but always to "keep well ahead of the times." Today, as in the post-war world, Murchey pledges its resources, trained skill and engineering leadership to maintain that tradition. Past, present and future —the saying always holds true—YOU CAN DEPEND ON MURCHEY.

MURCHEY MACHINE & TOOL COMPANY
DETROIT 26, MICHIGAN

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POSTWAR PLANNING can begin with the tools you purchase today. In the field of marking Noblewest equipment is designed to give you 1) the finest precision marking at speeds critical war production demands; 2) greatest possible adaptability in retooling for competition in post-war markets. Write for catalog supplement No. 43 — Your Guide To Faster, Better Marking.

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MARK IT BEST WITH NOBLEWEST® NOBLEWEST IMPROVED MARKING DEVICES

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REMOVING INSOLUBLE SMUT FROM STEEL PARTS SAFELY

Today's best answer to the problem of removing tenacious, insoluble smut from steel before electroplating is ANODIC degreasing with Oakite Composition No. 90.

This carefully engineered material is fast-working, thorough. Possessing exceptional conductivity, wetting-out, penetrating and emulsifying properties, it speedily removes all smut and soil. The surfaces you get are CHEMICALLY clean. Write for free booklet giving details.

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Technical Service Representatives Conveniently Located in All Principal Cities of the United States and Canada

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DRILL JIG BUSHINGS

STANDARD SIZES AVAILABLE FROM STOCK!

Made to A.S.A. Standard in HEADLESS PRESS FIT, HEAD PRESS FIT, FIXED RENEWABLE, HEADLESS LINERS and SLIP RENEWABLE types—also a complete line of Accessories.

Manufactured to precision tolerances from fine grade of tool steel carefully heat treated.

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ACCURATE BUSHING CO., 440 North Ave., Garwood, New Jersey

...the "Science of Application"...

brings out the best in cutting fluids!

Stuart's Thred Kut SOLVOL "Super-Kool" CODOL

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CHICAGO, U. S. A. · LTD. · EST. 19

Threading Problems?

CALL "THE GREENFIELD MAN"

★ Located in every industrial area in the United States, "The Greenfield Man" is probably only a few minutes or hours from *your* plant. He is ready to bring you expert advice on any of your threading operations.

★ By maintaining the largest staff of specialized field men in the industry, the Greenfield Tap and Die Corporation *brings to you* its complete and extensive engineering, research and manufacturing experience and facilities.

★ Call *your* "Greenfield Man", through *your* Greenfield distributor, whenever you want help in any phase of threading.

Greenfield literature available on screw threading includes: "Facts About Tapping," "Choosing the Right Tap," and the new "Greenfield Catalog No. 44." Write for copies or any other specific information today.

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GTD GREENFIELD

GREENFIELD TAP and DIE CORPORATION

GREENFIELD, MASSACHUSETTS

NOW—A PROVEN WHEEL "YARD-STICK" FOR SURFACE GRINDING

Do you have a surfacing job that you are not satisfied with? Does the wheel you are using tend to burn the work and fill up too quickly? Remove metal too slowly? Or does it wear too fast? Or leave a finish below your requirements?

If so, why not do what so many have done to find the best wheel for the job? Use the 846 K-1-V Dayton as your surface grinding "yardstick."

It cuts cool and fast. Gives an excellent finish. Wears at just about the right rate for topmost efficiency. Indeed, it's an even bet you will want to standardize on this 846 K-1-V Dayton. Short of that, it provides such a close measure of the important performance factors that repeated guesswork in wheel selection is usually eliminated.

The 846 K-1-V Dayton is made in a wide range of sizes—with trial wheels shipped from stock. Write, wire or phone.

SIMONDS WORDEN WHITE CO.
712 NEGLEY PLACE, DAYTON, OHIO

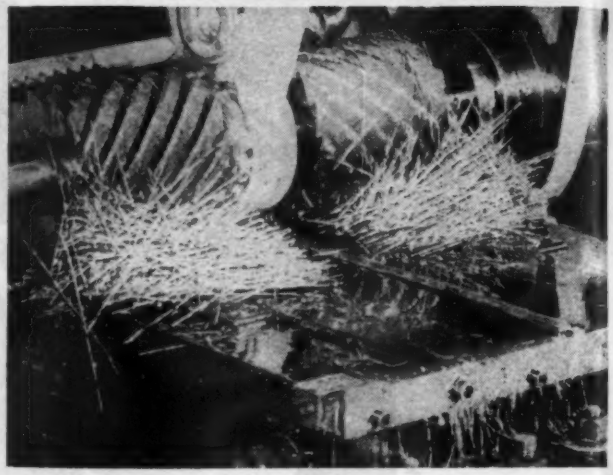
DAYTON CENTERLESS WHEELS

THE DAYTON WHEEL LINE
SURFACING
CENTERLESS
CYLINDRICAL
INTERNAL
SNAGGING

DAYTON GRINDING WHEELS

SOME "HARD-TO-HOLD" JOBS ARE DONE EASILY WITH

PERMANENT MAGNET TYPE CHUCKS



NO WIRES—NO HEATING—NO OPERATING COSTS

These chucks frequently simplify difficult holding problems for light machining operations. Easily installed or transferred from one machine to another. Write for complete information. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A

RECTANGULAR AND ROTARY MODELS

BROWN & SHARPE MAGNETIC CHUCKS
PERMANENT MAGNET TYPE

Famous for
- ACCURACY OF THREADS
- LOW CHASER COST
- ALL AROUND DEPENDABILITY

Bulletins available: General Purpose Die Heads, Insert Chaser Die Head, Threading Machines.

See our Advt. on page 388 Aug. 17, American Machinist

THE EASTERN MACHINE SCREW CORP., 20-40 Barclay St., New Haven, Conn.
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Let's

BACK THE ATTACK

By Buying WAR BONDS

COIL STOCK
FEED IT FASTER—with **LITTELL** AUTOMATIC CENTERING **REELS**

REEL off your stock for faster production with LITTELL Automatic Centering Reels, for a free-flowing loop of material to presses—hand or automatic feed.

Ask about the Littell line of Reels, Feeds (Roll, Dial, Magazine, Hopper), Straightening Machines, Air-Blast Valves, Pres-Vac Safety Feeders, etc.

WRITE FOR BULLETINS

F. J. LITTELL MACHINE CO
4163 RAVENSWOOD AVE CHICAGO 10

Making Stainless Steel Electrodes is a McKAY Specialty . . .

Using them is yours!

Here is a Helpful Booklet About *Welding Stainless Steel*

McKay Stainless Steel Welding Electrodes are "tops" in quality. There are good reasons for this leadership.

Among these are the standard McKay practices of: (a) Continued research in the Mellon Institute at Pittsburgh, Pa., as well as in our own laboratory at York, Pa.; (b) Analyses and correct selection, before coating, of *all* core wires; (c) use of *either* Titania or Lime Coating as preferred by you . . . not just one coating for all grades; (d) Every "batch" pilot tested before production; (e) production runs crack tested, pad analyzed, weld metal analyzed, physically tested . . . or all of these if necessary . . . to *prove* quality; (f) Exact analysis stamped on each package and certified upon request. These precautions, plus most modern production facilities, assure you of complete uniformity and successful performance.

You can weld better with these better electrodes! To test your knowledge of practical stainless steel metallurgy, ask for your free copy of the new booklet, "Things to Know About Welding Stainless Steels."

TRY YOUR HAND AT THESE QUESTIONS ABOUT STAINLESS STEEL

		TRUE	FALSE
7.	Stainless Electrodes which are to be used for welding Stainless Vessels subject to Corrosive action, must be stabilized to prevent Carbide precipitation.	☐	☐
8.	Carbide precipitation does not affect the heat resisting properties of Stainless Steel.	☐	☐
9.	Molybdenum is added to Stainless Steels to increase their sealing resistance at elevated temperatures.	☐	☐
10.	Not all Stainless Steels are classified by metallurgists as "Austenitic."	☐	☐

ANSWERS: 7. False; 8. True; 9. False; 10. True.

General Sales Office: York, Penna.

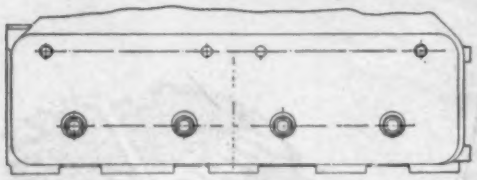
THE McKAY COMPANY
PITTSBURGH, PA.

WELDING ELECTRODES . . . COMMERCIAL CHAINS . . . TIRE CHAINS

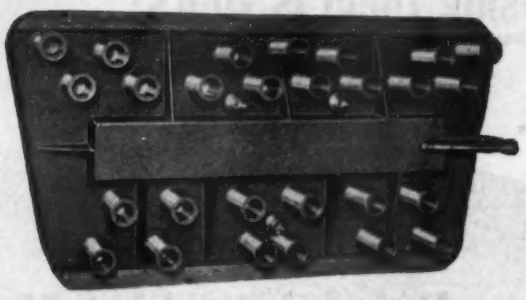
Special HOEFER Unit
. . DRILLS AND REAMS THREE DIFFERENT CYLINDER HEAD PARTS

★ HOEFER Heads were designed to meet the need for maximum flexibility and they do it efficiently and economically.

This interesting 27-spindle full anti-friction head, with three groups of spindles is capable of being driven in individual groups by engaging drive through one of the three gear shift buttons shown. Forced cascaded lubrication provided in head which was driven by vertical hydraulic feed driller. This head in combination with the fixture we furnished drills the bolt holes in three different sizes of Diesel engine cylinder heads.



This HOEFER Multiple Spindle Head is an example of the ability of HOEFER engineers to meet the most unusual hole drilling requirements, giving you a simplified method and one that ensures time and cost savings. HOEFER Heads are attachable to your own drill presses or turret lathes. Among the benefits are savings in floor space as well as the cost of new machinery.



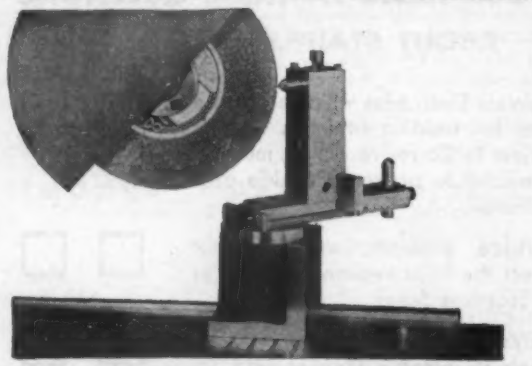
• Typical Diesel Cylinder head layout drilled and reamed 51' per minute, 28€ r. p. m., 010" feed, 1½ travel — requires only 31 seconds total time.

Having designed thousands of heads our engineers can easily develop a multiple drilling head to fully meet your specific needs. Write, telling us about your job.

Hoefer's Whole Business is Holes . . . .

HOEFER MFG. CO. *Freeport, Ill.*

The "FORM-MASTER"
ANGLE & RADIUS DRESSER



An all-purpose angle and radius dresser for high-precision at low cost. Accurate easily within .001". Simple to operate. Dresses in vertical position enabling operator to SEE the form in work. All parts hardened and ground (except cast-iron base which can be drilled and tapped). Suitable for surface and cylindrical grinders. Two 1/3 ct. diamonds and instrument case included. $150.00.

It readily produces: Any desired angle
Convex radii to 4" on 7" wheel
Concave radii to 7" on 7" wheel

Specifications: Base 3" x 3", height 8½"
Wheel capacity 10"
Angular travel 3"

For information or a demonstration CALL YOUR SUPPLIER

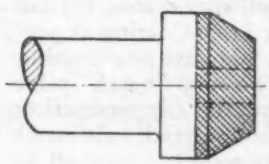
Manufactured by

J. & S. TOOL CO.

477 Main Street East Orange 1, N. J.

"PRECISION DRESSING TOOLS"

CARBIDE CENTERS

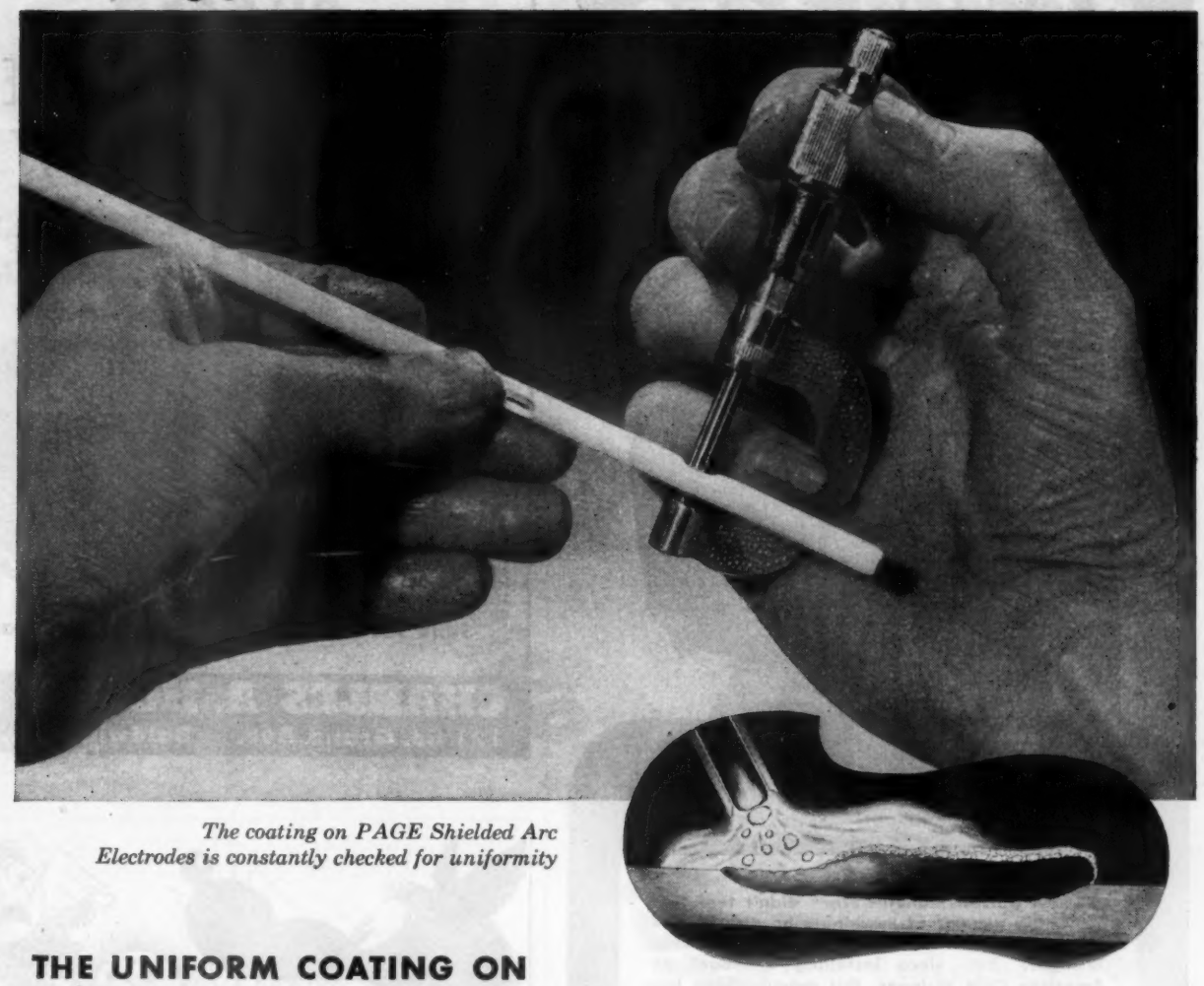


STANDARD POINT ALSO BULL TYPE

These centers combine the high quality of Ready Tool Company products with the long life of tungsten carbide points.
Standard carbide centers in stock.

The READY TOOL CO.
IRANISTAN & R. R. AVENUES
BRIDGEPORT . . . . . CONN.

PAGE *Welding* ELECTRODES



The coating on PAGE Shielded Arc Electrodes is constantly checked for uniformity

THE UNIFORM COATING ON PAGE-*Allegheny* STAINLESS STEEL ELECTRODES HELPS YOU CONTROL STAINLESS WELDS

Certainly the analysis of the rod and the type of coating are vitally important in controlling stainless welds. **PAGE** went to the world's largest producer of stainless steel to make certain that **PAGE-*Allegheny* STAINLESS STEEL ELECTRODES** would be right.

But that isn't all. To meet the demands of good welding, there can be very little variation in the thickness of the coating. So, in order that you may be sure of good results, the coating on **PAGE-*Allegheny* STAINLESS STEEL ELECTRODES** is constantly checked for uniformity. **PAGE** inspection is your reassurance of uniformity in these electrodes.

HI-TENSILE "C" ELECTRODES • For vertical, overhead or horizontal welding of carbon steels, **PAGE** recommends **HI-TENSILE "C" SHIELDED ARC ELECTRODES.** These electrodes can be depended upon for welds that pass rigid tests for tensile strength, elongation, resistance to impact and fatigue. Ask your local **PAGE** distributor for specific information.

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Pittsburgh, Portland, San Francisco

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

ESSENTIAL PRODUCTS • TRU-LAY Aircraft, Automotive, and Industrial Controls • TRU-LOC Aircraft Terminals • AMERICAN CABLE Wire Rope • TRU-STOP Brakes • AMERICAN Chain • WEED Tire Chains • ACCO Malleable Castings • CAMPBELL Cutting Machines • FORD Hoists, Trolleys • HAZARD Wire Rope • MANLEY Auto-Service Equipment • MARYLAND Bolts and Nuts • OWEN Springs • PAGE Fence, Shaped Wire, Welding Wire • READING-PRATT & CADY Valves • READING Steel Castings • WRIGHT Hoists, Cranes • WILSON "Rockwell" Hardness Testers

In Business for Your Safety

Skeptical... SAVES $852

★ A Detroit manufacturer* didn't feel that the amount of machining he did, requiring cutting oil, would justify purchase of a Chip Wringer. Yet, since installing a Model 26 American Chip Wringer, this manufacturer has saved $852.72 worth of cutting oil in 19 months (@ 25c gal.). This, with the Chip Wringer running only two loads a day—*less than 5% of its rated capacity.*

"At this rate", writes the manufacturer, "the machine will have paid for itself in 22 months, and after that, will earn us $45 per month, every month".

In only 3 *minutes* running time an American Chip Wringer reclaims more than 90% of the cutting oil from a load of metal chips or machine turnings. Can be operated by any unskilled person.

*Name furnished on request.

★ American Chip Wringers are available in following models: $20, $26, $30, $40, $48. ★

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SEND FOR ILLUSTRATED CATALOGS

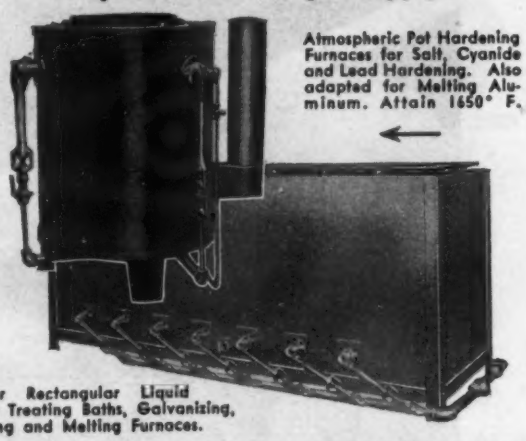
The AMERICAN LAUNDRY MACHINERY COMPANY
CINCINNATI 12, OHIO

✓ PLAN TO INSTALL

BUZZER
Reg. U.S. Pat. Off.

INDUSTRIAL *Gas* EQUIPMENT

NO BLOWER or POWER NECESSARY
. . . just connect to gas supply

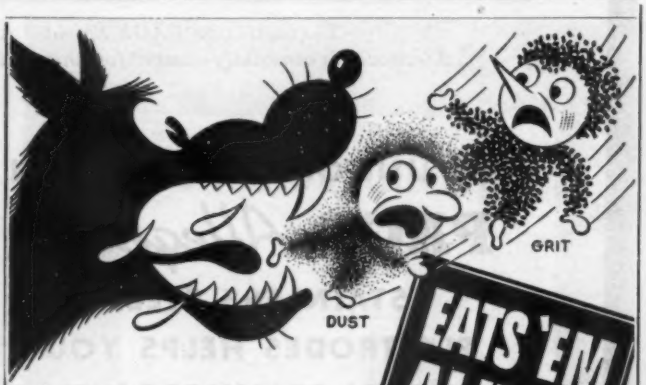


Atmospheric Pot Hardening Furnaces for Salt, Cyanide and Lead Hardening. Also adapted for Melting Aluminum. Attain 1650° F.

Buzzer Rectangular Liquid Heat Treating Baths, Galvanizing, Tinning and Melting Furnaces.

Send for the complete "BUZZER" Catalog

CHARLES A. HONES, INC.
121 So. Grand Ave. Baldwin, L. I., N. Y.



EATS 'EM ALIVE!

Dust and Grit are easy prey for the AIR MASTER. Once installed on a grinder or buffer, the AIR MASTER sucks the dust and grit right off the whirling wheels. No longer do you have to worry about flying dust and grit injuring the lungs of your employees and causing breakdowns of expensive machinery by getting into sensitive moving parts.

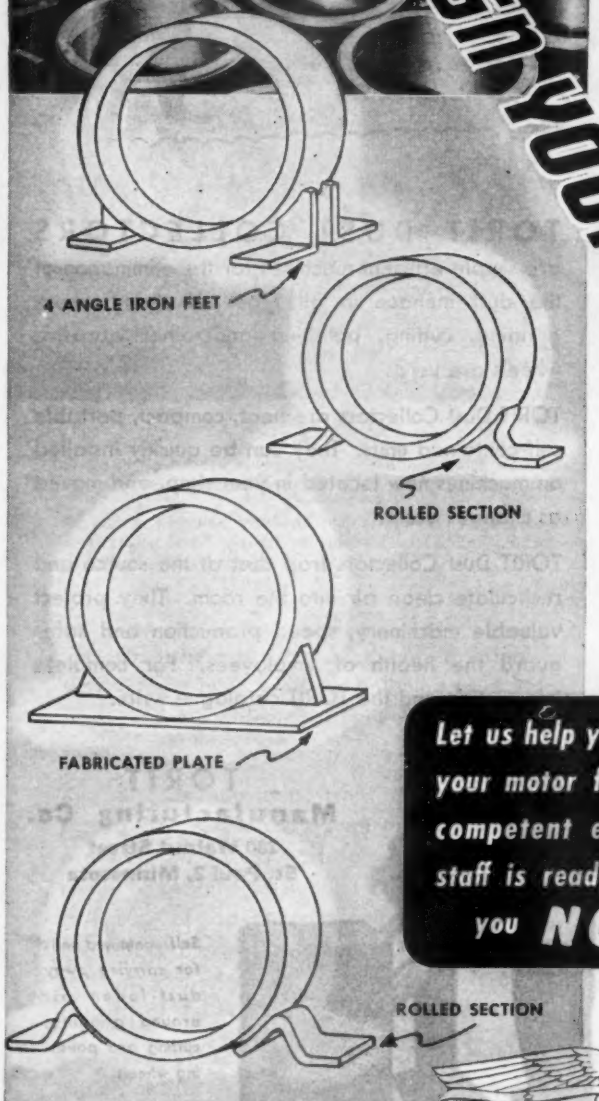
AIR MASTER eats 'em alive and digests them thoroughly, leaving the air about your grinders and buffers free from these deadly destroyers of health and machinery.

The AIR MASTER is fully self-contained . . . efficient, rugged, dependable. A size for every grinder or buffer. Write today for full details.

NOW AVAILABLE: Two, three and five H.P. grinders and buffers on AA-5 priority or better.

The Cincinnati
ELECTRIC DRILLS • GRINDERS • BUFFERS • PORTABLE TOOLS
The Cincinnati Electrical Tool Co.
DIVISION OF THE R. K. LE BLOND MACHINE TOOL CO. CINCINNATI, OHIO
2676 MADISON RD

LET AMERICAN WELDING REDESIGN YOUR MOTOR FRAMES



● Many motor manufacturers have switched from cast motor frames to fabricated frames. It is important that you keep your eye on postwar applications which will necessitate further redesigning. Our experience over many years in rolled flash butt welded motor frames enables us to help you in redesigning.

American welded steel rings have all the advantages inherent in a rolled product . . . savings in weight . . . resistance to impact and shock . . . freedom from pores, and closer rough ring tolerances which reduce machining time and cost. The forge weld has no affect on the magnetic or electrical properties of the field.

THE AMERICAN WELDING & MANUFACTURING COMPANY
WARREN, OHIO

BACK THE ATTACK—
BUY MORE WAR BONDS

Let us help you redesign your motor frames. Our competent engineering staff is ready to assist you ***NOW!***

AMERICAN WELDING
WARREN, OHIO
STEEL PRODUCTS FABRICATED BY RESISTANCE. ARC OR GAS WELDING

Don't Lose Vital WORK HOURS *with* ONE LONE GRINDER

One lone grinder surrounded by several men waiting to use it means lost production and wasted work-hours. Several Low-Cost Queen City Grinders conveniently placed throughout your plant will quickly pay for themselves in time saved and increased production. Queen City Grinders meet every production requirement, whether it's large or small lots. Send for new catalog giving complete details and prices. Agents in principal cities.

(Illustrated) Model 3-F, 1 H. P. Queen City Heavy Duty Grinder. A low-cost, ball-bearing grinder of unusual productive capacity and durability . . . built to handle the heaviest loads. Completely equipped, ready for instant use.

SEND *for* NEW CATALOG

QUEEN CITY MACHINE TOOL CO.
217 E. SECOND ST. CINCINNATI 2, OHIO

It's No Trick At All With TORIT

TORIT DUST COLLECTORS are simple efficient machines for the elimination of the dust menace in all types of shops where grinding, cutting, polishing and other abrasive wheels are used.

TORIT Dust Collectors are neat, compact, portable self-contained units. They can be quickly installed on machines now located in your shop, and moved as changes occur.

TORIT Dust Collectors trap dust at the source and recirculate clean air into the room. They protect valuable machinery, speed production and safeguard the health of employees. For complete information and the TORIT catalogue write:

TORIT
Manufacturing Co.
280 Walnut Street
St. Paul 2, Minnesota

Self-contained units for carrying away dust-laden air around grinding, cutting and polishing wheels.

TORIT Dust Collectors
SELF-CONTAINED UNITS

Modern KIRK & BLUM Dust Control System

SUPPLANTS *TWO* PREVIOUSLY USED *SYSTEMS*

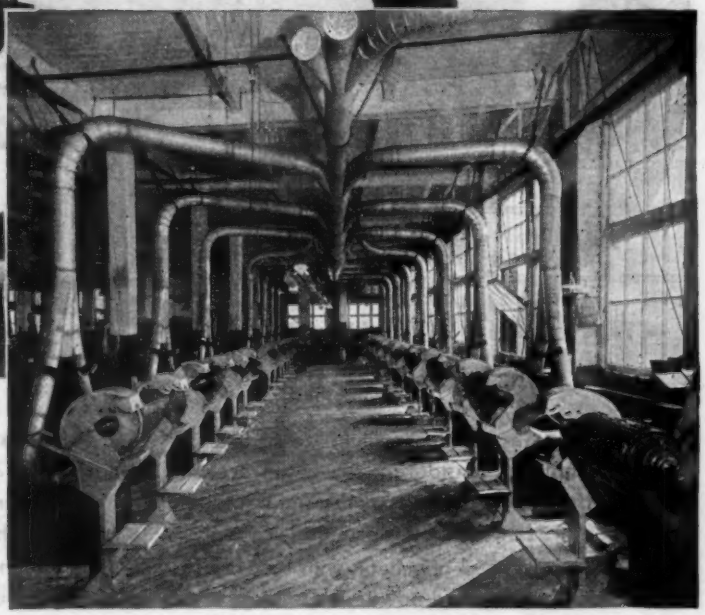


Photo at right shows only one half of the installation we made for a large manufacturer of wrenches and other hand tools.

All piping is located overhead and vertical branches brought in at ceiling level to conserve valuable space. Fan, collector and motor located on roof.

Collecting the dust from 32 double grinders, involving 64 wheels used for polishing operations, presented a problem that called for specially designed equipment.

Kirk & Blum engineers, after a thorough survey, designed a dust control system that not only solved the present problem but made provisions for future requirements. Specially designed hoods offer operators a maximum of adjustments and also trap undesirable articles that might get into the system. A special foot rest adjustable to height above floor is also provided as part of the hood design.

Uniformity of suction is maintained by correct design of piping and streamlined fittings so as to produce the correct suction of each hood with a minimum use of power. This is another typical example of why it does not pay to let guesswork leave you "stuck" with units that are not right for your particular job. Get the unbiased counsel and planning of experts—Kirk & Blum Engineers—and you will get a dust control system that is *right*. For further details write to—

Send for any of the following Booklets:

"Data on KIRK & BLUM Production Facilities"

"Dust Collecting Systems in Metal Industries"

"Fan Systems for Various Industries"

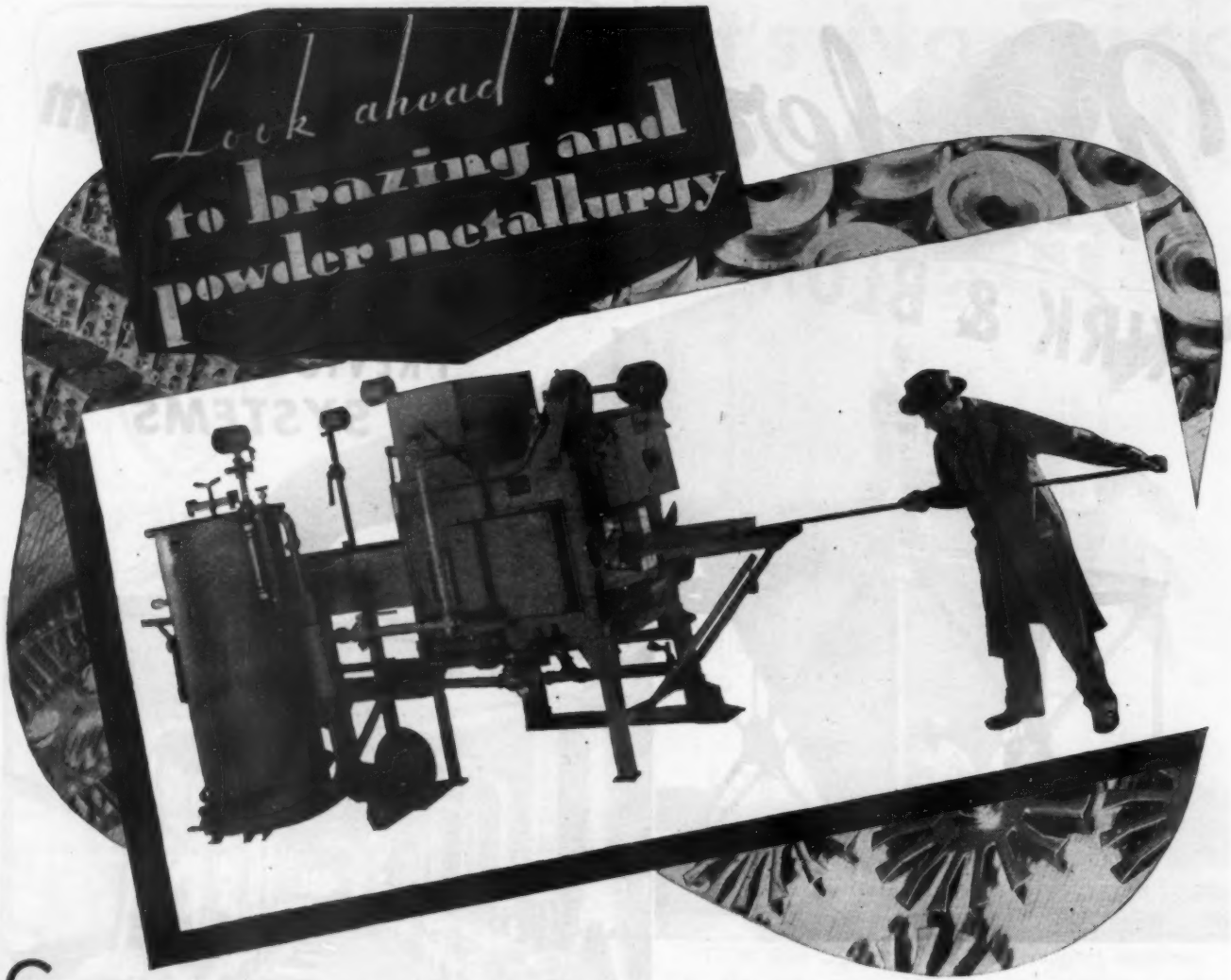
"Blower Systems for Woodworking Plants"

"Industrial Ovens"

"Cooling Systems for the Glass Industry"

The KIRK & BLUM Manufacturing Co.

2800 SPRING GROVE AVE. CINCINNATI 25, OHIO



Great changes loom ahead in metal fabrication! You might well consider the low cost processing and speedy output possible in the fields of both production brazing and powder metallurgy.

We have prepared a bulletin with valuable information on brazing and powder metallurgy which is free for the asking. It contains sketches and photographs of brazing metal application and descriptive material on powder metallurgy methods. It also gives illustrations and detailed descriptions of the new Lindberg High Temperature Brazing Furnaces, one of which is pictured above.

These new furnaces are sturdy, carefully engineered units designed to operate at a temperature up to 2500° F. with precise temperature control and heating uniformity, plus a neutral controlled atmosphere. They cut production costs to the bone and on certain sub-assemblies give more strength, simplicity of fabrication and cleaner work. They have outstanding advantages in economy of operation, easy maintenance and operator convenience in loading and unloading.

In the larger sizes they may also be used for other purposes such as hardening high speed tools and dies for your toolroom and for bright annealing, normalizing and other heating operations requiring a protective atmosphere.

Write for Bulletin

You should know about new developments in these important metallurgical fields. Send for your copy today.

LINDBERG ENGINEERING COMPANY
2445 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

In Cleveland!
This furnace will be set up on exhibition at the Metals Show. Be sure to come to booth C-150.

ARMY E NAVY

Lindberg FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

CONTRACT WORK

PLANT EMPLOYING 200 PEOPLE HAS PRODUCTION TIME OPEN

- CENTERLESS
- TURRETS
- MILLERS
- SHAPERS
- GRINDERS
- LATHES
- SUPPORTING EQUIPMENT

Over 200 Machine Tools

BERGEN MACHINE & TOOL CO., INC.

189 Franklin Ave., NUTLEY 10, N. J.

MACHINES AND PARTS, SPECIAL TOOLS, ETC.

to your specifications

SPECIAL ENGINEERING WORK

. . . on Contract

It will pay you to investigate our facilities. As designers and builders of wire and ribbon stock forming machines we can offer you skilled and experienced assistance. Send us your blueprints or samples for prompt quotations.

We also solicit your bids for cam milling

THE A. H. NILSON MACHINE CO. Bridgeport, Conn.

METAL STAMPINGS

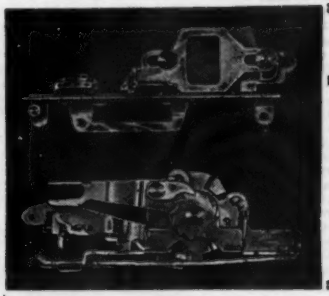
• TOOLS • DIES •

PERMANENT MAGNETS

HEAT TREATING

THOMAS & SKINNER STEEL PRODUCTS CO.

1103 E. 23rd St. INDIANAPOLIS, IND.



STAMPINGS and ASSEMBLIES

We can make long or short runs in any metal. Our modern equipment and methods, backed by 50 years of experience, are your guarantee of satisfaction. Our manufacturing facilities also include screw machine products, tools, dies, jigs and fixtures.

"Greater Savings with Greist"

Your order is assured of quality workmanship by skilled mechanics. We will furnish prompt quotations on your blueprints or samples. Write us today!

THE GREIST MFG. CO. 546 Blake Street New Haven, Conn.

• TOOL DESIGNING AND BUILDING • MACHINES DESIGNED • IDEAS DEVELOPED • PROMPT—EFFICIENT—SERVICE • • REASONABLE CHARGES •

OLD COLONY ENGINEERING CO.

180 Weeden St. • Pawtucket, R. I.

P.O. Box 672 • Tel. Blackstone 2610

Write — Phone or Telegraph

GENERAL MACHINE WORK

Lathe, Mill, External and Internal Grinding, and Drill Press Equipment. Tool shop work or precision production. Low time rate or job estimates.

Old, Established Firm, started during last war

THE GILBERT-BAKER-MIDLAM CO.

Dept. AM, DAYTON 2, OHIO

MACHINE SHOP WANTS DEFENSE WORK

Lathes, Milling Machines, Drill Presses, Riveting, Hot Dip Tinning, Jigs and Fixtures. Investigate TODAY.

STEPHEN J. LEWIS ENGINEERING CO.

215 Butler St. TRiangle 5-5348 Brooklyn, N. Y.

PRECISION FORM GRINDING

Specialists in grinding Circular and Flat FORM-TOOLS, FORM Counterbores, FORM Flat-Drills, and related types of FORM grinding. Also step-grinding of Tungsten and Molybdenum Rods.

Send Prints for Quotation and Delivery

J. & S. TOOL CO.—477 Main St.—E. Orange 1, N. J. (Makers of J.&S. Radii & Angle Dressing Tools)

MACHINE SHOP WANTS DEFENSE WORK

SCREW MACHINE, LATHE, MILLING MACHINE, POWER PRESS, JIGS AND FIXTURES

FREEPORT MACHINE WORKS, INC.
124 East Sunrise Highway, Freeport, N. Y.
New York Office
16 East 52nd Street, New York 22, N. Y.

Well known jobbing machine shop desires product for post-war manufacture.

T. J. GUNDLACH MACHINE CO.

226 Centerville Ave., Belleville, Ill.

WIRE AND METAL SPECIALISTS

in round, flat, square and special shaped wire in all metals.

LARGE PRODUCTION CAPACITY

Plating and finishing.

EASTERN TOOL & MFG. CO.

BLOOMFIELD, N. J.

REBUILDING

(Additional Rebuilding Advertising on pages 284 and 285)

LET US REBUILD AND MODERNIZE YOUR MACHINE TOOLS

Our Methods of Rebuilding are similar to the Methods used by Manufacturers of New Machine Tools. Each Machine is Disassembled—Castings—Replaned — Hand-scraped — Spindles Reground and Bearings Refitted. All Worn-out Parts Replaced — including gears — Re-Lined and Machines Run in and Tested under Load.

We therefore are in a position to guarantee accuracy for our Rebuilt Machines to be Similar to new Machines.

We will design and build your Jigs and Fixtures.

VOLYN MACHINE TOOL WORKS, Inc.

149 BROADWAY, NEW YORK 6, NEW YORK

PATTERNS in WOOD and METAL

GENERAL PATTERN WORKS

2233 Beck Street Cincinnati, Ohio

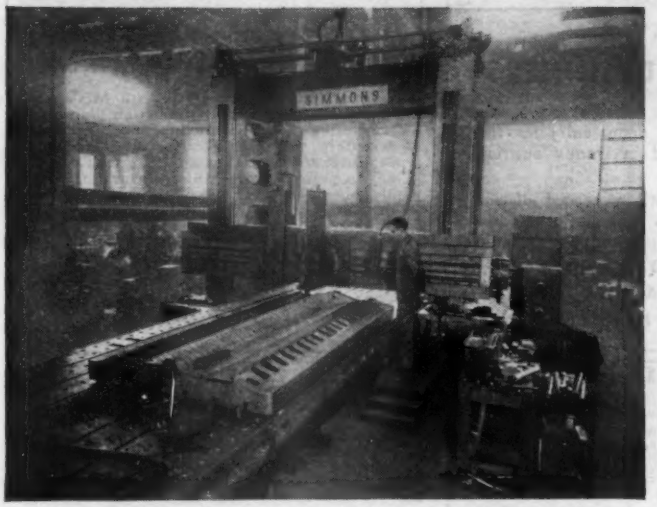
ITEM NO. 8233 **PRODUCTION LIST** DATE LISTED

DESCRIPTION Giddings & Lewis BLDG. NO. BAY NO.

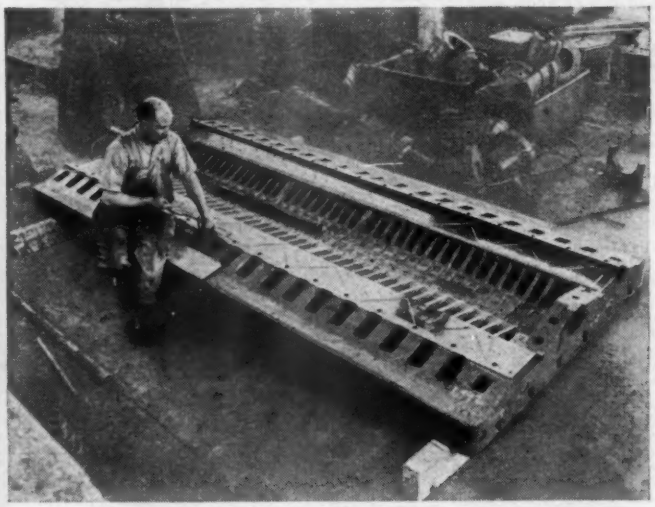
DELIV PROMISED FOREMAN

PART NO.	QN.	DESCRIPTION	MATERIAL	TO BE MADE BY		REMARKS
	1	Motor				
	1	Rainfeed Unit				
	1	Change Feed Gear Box				
	1	Weld Handle				
	1	Carr. Tablescrew as per sam.				
	1	Cross Table Nut to fit part #5				
	1	Tablescrew as per sam.				
	1	Table Nut to fit part #7				
	1	Head Leadscrew as per sam.				
	1	Head Lead screw nut to fit part #9				
	1	Sr. Bushing				
	1	Clutch Handle Pin as per tag				
	1	Head Lead screw bracket bore to 2.250"				
	1	Head Lead screw Bushing as per tag				
	10	Wiper bolts springs				
	20	Wiper bolts 10/32 T				
	1	Light cut on bearing O.D. 1.885"				
	1	Table drive bushing as per tag				
	2	Roller ball bearings as per sam.				
	1	Clean up cut on roller as per tag				
		Grind ways of column				
	1	Shaft for key way				
	1	Collar as per tag				
	1	Table to planer				
		Arm Bore to bush.				
		Bushing to fit part #31				
		Grind Rails				
		Shim Gibs				
	1	Nut (New) on table				
	1	Screw to fit nut above				
	1	Gib Bronze (new)				
	2	Thrust collars (new)				
	1	Radial thrust bearing				
	1	Self aligning thrust brg.				
	12	New oil fittings (new)				
	2	New clutch shoes (new)				
	1	Clutch fork pin (new)				
	7	Taper pins (new)				
	1	Clutch shaft (new)				
	1	Idler Gear (new)				
	2	Aetna bearings				
	2	Auburn "				
	2	Jafnir "				
	1	Low departure bearing				
	100	Bijur Lub. oilers				
	80	5/32" Bijur Tubing				
		Replace standard Scales with verniers				
	1	Replaned bed & rescrape				
	1	Replaned saddle & rescrape				
	1	Refitted hardned plates				
	1	Refitted brass plates on table side				
	1	Rescrape Table & refitted plates				
	1	New main spindle				
	1	New Quill				

A Typical Engineered Rebuilding Job By Simmons



Replaning the table of a large Giddings & Lewis Horizontal Boring Mill on a 120" x 42' Simmons Planer.



Hand-scraping the table bearings to insure a perfect fit on the saddle. Bronze wear stripes are added to the table.

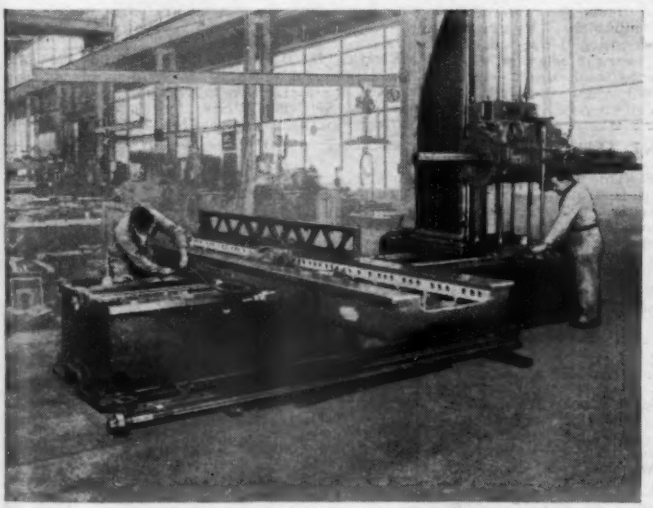
Have your machine tools aged much these last few years? You bet they have.

That's why reconversion-minded management in many leading plants are taking "physical inventory" of the condition of their present equipment and initiating systematic programs of *Engineered Rebuilding* by Simmons Machine Tool Corporation.

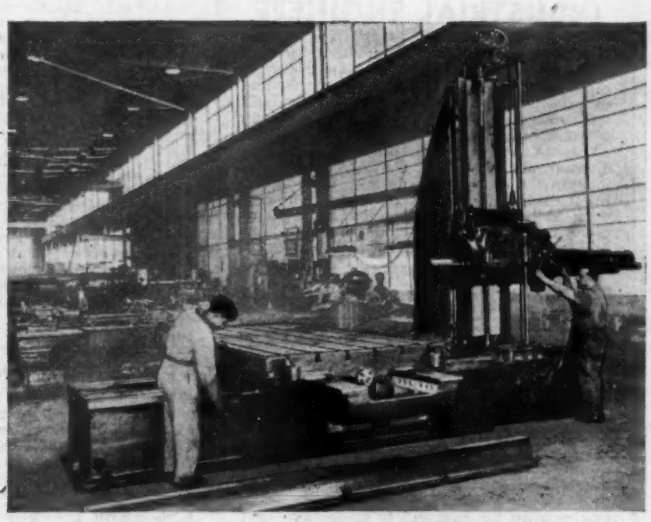
For Simmons engineers have developed techniques that not only restore a worn tool to its maximum efficiency but often "build in" new utility beyond its originally designed capacity.

Add *Engineered Rebuilding* to your reconversion agenda. Start today by sending us a list of the machines you need rebuilt. We'll show you how "The Simmons Way" can see your program through.

SIMMONS MACHINE TOOL CORPORATION
1759 NORTH BROADWAY, ALBANY 1, N. Y.



Assembling the machine prior to tests under power. Note the addition by Simmons of tool wear stripes to the saddle slides.



Engineered Rebuilt; having been dismantled to the main castings and pressure-cleaned, all worn parts renewed.

SIMMONS *Engineered* REBUILDING

SEARCHLIGHT SECTION

POSITION VACANT

Experienced Mechanical Engineer

Engineer wanted with wide experience in designing and developing light machinery. To be considered applicants must have had wide experience in Engineering and Development work and must be competent to direct and supervise all details.

An exceptional opportunity to become connected with a highly successful firm outstanding in its field; modern plant, up-to-date methods, and located in a large northeastern seaboard city, with attractive nearby suburbs, good homes and surroundings.

For consideration state in detail present position, past experience, education, age, and salary desired. Interview will be arranged; all correspondence will be considered strictly confidential.

P-908, American Machinist
330 West 42nd St., N. Y. 18, N. Y.

CHIEF ENGINEER
Post-War Opportunity

Long-established, financially sound, manufacturer wood pencils, mechanical pencils, fountain pens, allied products, New York area, requires competent engineer to organize and supervise product engineering; process and methods; tool, die and special machine design; development, tryout and improvement of equipment; tool and machine shop operation. Preferably man with tool or machine shop experience who has worked as designer of tools and special machinery. No conversion problem. Write giving complete data on experience, education, availability, compensation. Confidence will be respected.

P-941, American Machinist
330 West 42nd St., N. Y. 18, N. Y.

WANTED

INDUSTRIAL ENGINEER

Progressive 40-year old engineering firm in Detroit offers excellent opportunity for man with successful records as Industrial Engineer and proven ability to organize and get results. Graduate Engineer or equivalent with Industrial background covering all phases of Industrial work to head department involving product design, production planning and control, processing, machine, tool and die design, time study, plant layout, etc. Salary commensurate with ability and performance. State complete details of age, education, past experience and salaries earned.

P-938, AMERICAN MACHINIST
520 N. Michigan Ave., Chicago 11, Ill.

WANTED

Research and Development Engineer

Connecticut company manufacturing screw machine products, wire forms, stampings and metal specialties wants man with engineering background to undertake and direct development and design of new products. Practical knowledge of materials and tooling essential. Age 35-45. Write stating age, training, experience and salary required. Address

P-939, AMERICAN MACHINIST
330 West 42nd St., New York 18, N. Y.

WANTED

MACHINE DESIGNERS

Experienced on the design of special machinery. Excellent opportunity for first class men interested in steady positions in New England.

Only men 35-55 with a record of successful achievements will be considered. In replying furnish information preliminary to a conveniently arranged interview.

P-940, AMERICAN MACHINIST
330 West 42nd St., New York 18, N. Y.

OPPORTUNITY

60-year young firm with enviable record as builders of a varied line of light to medium weight machinery has opening for man of broad experience to head up its design and development department.

This man is probably about 40 years of age and has good working knowledge of pattern shop, machine shop and foundry practice; preferably has job shop experience in designing and building machinery which can be successfully marketed.

He is interested in making a worthwhile, lifetime connection with pleasant, agreeable associates in a modern shop situated in a Southern Michigan city having excellent schools and college. Salary dependent upon ability and experience of applicant. Your reply will be held in strict confidence.

P-948, AMERICAN MACHINIST
330 West 42nd St. New York 18, N. Y.

POSITIONS VACANT

WANTED: Mechanical Engineer with experience in welding design, to work in engineering and sales promotion. Splendid opportunity for the right man. Address P. O. Box 247, Middletown, Ohio, and state qualifications and salary expected.

WANTED: SEVERAL mechanical engineers and machine designers. Men experienced in designing precision machine tools preferred. Permanent positions with old established company whose products are recognized standards of quality. Location Pennsylvania. P-943, American Machinist, 330 W. 42nd St., N. Y. 18 N. Y.

TOOL ENGINNEER or mechanic—Thoroughly familar with tool setups and machining stainless, alloy, carbon steels. Required for customer contact work by Steel Distributor covering eastern states. Write stating age, education, experience, draft status, availability, and salary expected. Replies strictly confidential. P-944, Amer. Mach., 330 W. 42 St., N. Y. 18, N. Y.

WANTED: TOOL engineer by Middle West manufacturer of small parts for automotive and other mechanized equipment. Progressive organization, in business since 1850; employs 1400 people. Permanent postwar position. State age, education, experience and draft status. Must comply with WMC regulations. P-945, Amer. Mach., 520 N. Michigan Ave., Chicago 11.

EMPLOYMENT SERVICE

SALARIED POSITIONS—This advertising service of 34 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details, R. W. Bixby, Inc., 366 Delaware Bldg., Buffalo 2, N. Y.

POSITIONS WANTED

EXPORT EXECUTIVE. Over twenty years experience in every phase of export in the U. S. and abroad. Excellent record of accomplishment, fluent in the principal commercial languages, widely traveled, thoroughly competent and reliable. PW-928, American Machinist, 330 W. 42nd St., New York 18, N. Y.

ENGINEER presently employed seeking change with post-war future. Thirty-two years experience on machine tool manufacturing; tool, die, machine and adding machine designing. Toolroom, maintenance and production supervision. Production, process and methods engineering. Chief estimator on ferrous and nonferrous metal stamping and finishing. Some experience welding and forgings. Age forty-eight. Excellent health. PW-929, American Machinist, 520 N. Michigan Ave., Chicago 11.

FACTORY CONTROL SYSTEMS, PERMANENT

Unusual sales opportunity with McCaskey Industrial Controls for production planning, scheduling, follow-up, costs, machine load, inventory, tool cribs, etc. See advertisements in July 20, Aug. 17, and Sept. 14 issues of American Machinist. Our District Managers average more than ten years in present locations. Two established districts now open. Diversified production experience essential. Address details your qualifications to

Industrial Division

THE McCASKEY REGISTER CO.
101 West 31st Street New York (1)

POSITIONS WANTED

EXECUTIVE 35 years experience — qualified to supervise tool design. Tool room and production as superintendent or assistant to chief executive. First class organizer and systemizer. 12 years with present employer. Desire permanent connection, in a smaller city. Address—A. R. E., 5544 Underwood, Detroit 4, Mich.

ENGINEER EXECUTIVE—Wants permanent position with reliable firm. Experience in metal fabrications and machine operations; industrial engineering, tool and welding engineering; product engineering and development; labor problems and supervision; and management organization. PW-946, American Machinist, 330 W. 42nd St., New York 18, N. Y.

GENERAL OR works manager—Graduate ME-EE. Manufacturing executive interested in postwar program. Extensive knowledge of all phases of metal fabrication. Excellent background of sales, purchasing, manufacturing, engineering, production, cost and personnel work in the manufacture of special machinery, machine tool accessories, electrical devices and precision work. Exceptional record of personnel administration, job evaluation and analysis. PW-947, American Machinist, 330 W. 42nd St., New York 18, N. Y.

EXECUTIVE—Works manager—Superintendent broad manufacturing background. Proven administrative ability. Experience operating plant 3000 employees. Supervision over departments as: manufacturing, operating, maintenance, engineering, production, personnel, labor relations, methods, accounting, laboratory, etc. Desire change for founded personal reasons. Age 42, excellent health. PW-949, American Machinist, 330 W. 42nd St., New York 18, N. Y.

PATENT ATTORNEY

PATENTS, COPYRIGHTS, Booklet, "General Information concerning Inventions and Patents" and "Free Schedule" sent without obligation, Established 1915. Lancaster, Allwine & Rommel, Suite 453, 815-15th St., N. W. Washington 5, D. C.

CONTRACT WORK

MANUFACTURING FACILITIES WANTED: Forging, cold-heading or punch press shop wanted to make several million pocket knife holsters for us. Write for samples. Union Cutlery Co., Inc., Olean, New York.

FREE BULLETIN

STOCK LIST No. 744—8½ x 11, 4 pages, classified in 18 groups, listing over a 100 machine tools "on hand for prompt shipment." Write Acme Equipment Co., 126 South Clinton St., Chicago 6, Ill.

(Continued on page 288)

FIELD COORDINATOR and CONTACT WORK

Young man with experience in field contact and coordination work seeks opportunities for his abilities. 6 years experience in instrument shop and inspection; 3½ years as coordinator for large instrument and manufacturing company. Extensive experience in coordination of purchasing, production, sales and service. Knowledge of Machinery, Heat Treat, and Control Equipment. Desires territory working out of Philadelphia.

PW-942, AMERICAN MACHINIST
330 West 42nd St., New York 18, N. Y.

(Selling, Business Opportunity and Wanted Advertising on page 288)

"FALK" for DEPENDABILITY in Rebuilt Machinery

OUR INVESTMENT IS YOUR SECURITY

"FALK" STOCK — A modern stock, with every item owned by "FALK" and in our warehouse or enroute. Shipments can be scheduled because "FALK" owns the machines. "FALK" critical inspection is given to every stock item. —Your inspection is welcome under ideal conditions for selecting machine tools.

"FALK" FACILITIES — Modern facilities to operate, rebuild and inspect used machine tools are provided to assure successful operation. Experienced personnel under supervisors with years of experience in our organization.

GOOD BUYS FOR THE MODERN SHOP* — IMMEDIATE DELIVERY

SHEARS

#372 Niagara, 72" x 10 ga.
#672 Niagara, 72" x 10 ga.

PRESSES

#4 Bliss D.C. B.G. Forging 4" stroke.
#4½ Bliss D.C. B.G. Forging 4" stroke (2).
#4½ Bliss 3 column B.G. 3" stroke
#5 Bliss D.C. B.G. Forging 3" stroke.
#74½ Bliss S.S. geared, 2" stroke.

BORING MILLS

100" Niles-Bement-Pond Bor. & Turn. Mill.
Vertical, 48" Gisholt.
Vertical, 52" and 60" Colburn.
Horiz. #36 Landis-Rochester, 3½ Bar Floor Type—Floor Plate 72" x 120".

DRILLING MACHINES

Weigel 22" B.G., Sl. Hd., tapping, P.F.
Superior 26" B.G., Sl. Hd., tapping, P.F.
Avey, 2 & 3 spindle Prentice, 4 spindle.
Henry & Wright, 6 spindle.
Leland Gifford 2 spindle.
Woodward & Rogers 6 spindle.

RADIAL DRILLS

5' Arm 11" Rd. Col. Cincinnati Bickford.
5' Arm 13" Rd. Col. Cinn. Bick. air clamp.
7' Arm 13" Col. Cincinnati Bickford
4' Arm 11" Col. Cincinnati Bickford

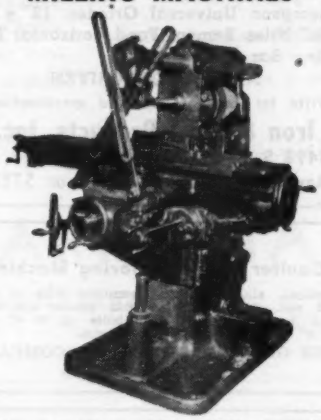
MULTIPLE DRILLS

Fox #15H 54 spindle hydraulic feed.
Fox #D-31 24 spindle motor drive.
Natco #D-5 8 spindle #1 M.T.

GRINDERS

16" Heald Rotary Surface Grinder.
12" Persons-Arter Rotary Surface Grinder.
12" Heald Rotary Surface Grinder equip with 9" Dia. Perm. Mag. chuck.
#2 Cincinnati Centerless Grinder, Filmatic.
#12 Greenfield Internal Hydromatic Grinder, sizematic type, complete with Tank and Pump.
Oliver Model 51 Drill Grinder; 1½" cap.
Pratt & Whitney 14x36 model B vertical surface grinder.

MILLING MACHINES



#2 Brown & Sharpe Plain Milling Machine. Range—28 Longitudinal travel. 10" cross travel. 19" Vertical travel. Table working surface 10" x 45".
No. 5 Cincinnati, High Power, Plain, S.P.D.
No. 4 Cincinnati, High Power, Plain, S.P.D.
No. 3 Cincinnati, High Power, Vertical
No. 2 Brown & Sharpe, Vertical, SPD.
No. 0 Bickett Vertical Bench Miller
No. 2 Cincinnati, High Power, Plain.
No. 2 Cincinnati, Motorized, Pyramid Col.
No. 2 Brown & Sharpe, Plain (10).
No. 1½ Brown & Sharpe, Plain (2)
#1 Kempsmith Universal, Cone Drive.
No. 1½ Valley City Universal, Cone Dr.
No. 1 Brown & Sharpe, Plain (6).
No. 12 P & W Lincoln Type Production (2).
Ames Precision Universal Bench Mill.
P & W 2" Duplex Spline Miller.
Hall Planetary Thread Miller 24"
No. 8 Lees Bradner Thread Miller.

PLANERS

120"x72"x35' Betts, 4 Heads, M.D.*
72"x72"x18' Pond Heavy Pattern, 4 Heads.
48"x48"x12' Putnam Heavy, 2 Heads, M.D.
30"x30"x12' American M.D., 2 Heads.
30"x30"x10' Cinn. Heavy Pattern, 2 Hds.
20"x20"x36" Niles-Bement-Pond, Planer Shaper, M.D.

LATHES

South Bend 16" x 6' Motorized Gap Lathe
Putnam 26 x 12 Heavy QCG, arr. for M.D.
American, 16 x 6 Q.C.G. Geared Head
Hendey, 16 x 10 Q.C.G., Turner M.D.
Potter & Johnston #6A Automatic Chuckers; 3½" dia. hole in spindle (2).

SHAPERS AND GEAR CUTTERS

14" Steptoe, M.D.
16" Queen City, M.D.
7" Rhodes Horiz. High Speed, Belt Dr.
26" Cincinnati Triple Geared Belt Dr.
#612 Fellows 36" Gear Shapers, (2)
12" Schuchart & Schutte Gear Hobber.
#3 Barber Coleman Gear Hobber: Serial Nos. 111.

BENDING ROLLS

Bertsch 3" x 3" x ⅜" angle bending roll.
Niagara pinch type 7" roll motor driven.

MISCELLANEOUS

Lakewood High Lift Truck, platform type, 4000# capacity, less batteries.
J. C. Miller Co. Lacq. Heater with acquistat.
Heat Treating Furnaces for the tool room, all sizes.
Sleeper & Hartley #1 Wire coiling machine for making BX cable.
50 K.W. Moesta Gun Welder Transformer, portable, 25 cy. 440 volts.
Grinding Wheels for #2 centerless 4" face, 20" diameter.
Blake and Knowles 12x2x12 Simplex Type, Hydraulic Steam Pump, 2000 lbs. pressure with 30 to 125 lbs. steam, delivers 9 gallons per minute.
Niagara #98 Brake & Folder, 72" cap. 14 ga. arranged M.D.
#228C Greenlee Vertical Hollow Chisel Mortizer, Power feed, M.D.

HEADQUARTERS FOR POWER PRESSES

*The above list, selected from our current stock, is subject to prior sale or subsequent additions. Hence we urge your prompt inquiries on any of these machine tools or others in which you are interested.

Buy from Stock

FALK MACHINERY MERCHANTS

18 WARD ST.

Tel. Main 6347-6348

FALK MACHINERY CO., ROCHESTER 5, N.Y.

(Continued from page 286)

SELLING OPPORTUNITY WANTED

EFFICIENT MACHINE designer desires outside contact work. Good reasons for changing. Clean record. Drafting and design experience. 11 years covering resistance welders and components; jigs, fixtures, tools, sheet metal fabrication, special machines sales proposals complete with specifications and pricing, plus recent plastics exerimental fabrication and testing equipment design. Sales experience: 5 years natural gas sales promotion comprising formal estimates, specifications, cost guarantees, customer follow-up on service or complaints, installations supervision and other duties associated with a vigorous campaign by an aggressive public utility serving both industrials and domestic accounts. 2 years specialties merchandising particularly hard goods ad major household appliances. Personal preference: Small growing concern, willing to pay conservative salary, limited expenses, and suitable commission or bonus on sound business obtained from protected territory. SA-948, American Machinist, 520 N. Michigan Ave., Chicago 11, Ill.

AUCTION

(See page 296)

WANTED

Man to coordinate sales and manufacture of Tungsten Carbide and Cast Alloy Division of nationally prominent tool steel manufacturer. Position requires executive ability, experience in sales and familiarity with selling prices of carbide specialties and cast alloy tools, as well as ability to supervise production. Salary open. In answering, give complete background. All replies held in confidence.

SW-937, AMERICAN MACHINIST
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Location — Ohio

Progressive engineering and tool manufacturing concern of twenty-five years standing is seeking a qualified tool designer who is, by virtue of experience, capable of heading up engineering sales, covering complete service in tool design, process engineering, production planning, plant lay-out, etc. We have an engineering organization of approximately sixty men and our manufacturing facilities are balanced in a manner to permit the handling of all types of work. This combination enables us to manufacture all tools and equipment which we design, if customer so desires. This is a first-class job for a high caliber man and offers unlimited post-war possibilities. Straight salary, or salary and commission. Give complete chronological record and all pertinent facts in your letter.

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Additional tool lines, especially cutting tools or gages. For lower Ohio, Indiana, and Kentucky.

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JOHN B. WEBENDORFER
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Excellent condition!

No. 4 Portage Horizontal Boring, Drilling & Milling Machine
5' American Plain Radial Drill
Thompson Universal Grinder, 12" x 30"
3⅞" Niles Bement Pond horizontal Boring Bar

ALL MOTOR DRIVEN

(Write for complete detailed specifications!)

Iron & Steel Products, Inc.
13498 S. Brainard Ave., Chicago, Ill.
"Anything containing IRON or STEEL"

FOR SALE

Coulter Diamond Boring Machine

Vertical, single spindle, complete with 5 HP, 440 volt, 3 phase drive with starter and work hold down—can finish bore holes up to 4" dia. by 3" deep. Machine ready to run.

THE OHIO ELECTRIC MFG. COMPANY
CLEVELAND, OHIO

1 — used Watson Stillman 600 ton single opening hydraulic press 16" dia. ram by 21" stroke downward acting. 42" daylight opening, 31" bottom bolster complete with pumps and motors.

Universal Hydraulic Machinery Company
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HYDRAULIC PRESS for PLASTIC WORK

100 to 150 ton capacity. Platens 20"x20". Complete with pump. Downstroke preferred.

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OTT MACHINERY SPECIALS

AUTOMATICS, Acme, Model C—9/16" M.D.
AUTOMATICS, Gridley, 9/16, ⅝ & 1¼" Mod. G.
AUTOMATICS, Cone, 1¼ & 1½" 4 spindle
AUTOMATICS, Gridley, ¾, 1¼, 1¾ & 2¼" Model F
AUTOMATICS, Gridley, 2¼, 3¼, 4¼ & 5¼" S. S.
AUTOMATICS, Cleveland, 1¼, 1½, 2½ & 3¼"
AUTOMATICS, Cleveland, ⅝, 1¼, & 2" Mod. B
AUTOMATICS, Cleveland ⅞, 1⅛ & 1½" Mod. M
AUTOMATICS, New Britain #22 & 24 M.D.
AUTOMATICS, Potter & Johnston #5a & 6A
DRILLS, Foote-Burt Heavy Duty, #5 M.T.
GEAR HOBBERS, 12 Barber-Colman, M.D.
GEAR SHAPERS, #7 High Speed, M.D.
GRINDER, Brown & Sharpe #2 Universal, M.D.
GRINDERS, Cincinnati 12" x 18" Plunge Cut
GRINDERS, Diamond Surface #3, M.D.
GRINDERS, Pratt & Whitney, 14" Vertical Surface, M.D.
LATHES, Hendey, G.H. 12"x5' and 6', M.D.
LATHES, Monarch 14"x6' & 20" x 8' M.D.
LATHES, J. & L. 3"x36" Dble Spindle
LATHES, Warner & Swasey #2, 4, & 6, M.D.
MILLING MACHINES, Becker Vertical Model S. D. 40" Rotary Table
MILLING MACHINES, Becker Vertical #5 & 6
MILLS, Briggs Production Type A&B
AUTOMETRIC JIG BORER, Horizontal Type
PLANER, Ohio 42" x 42" x 12' One Head, M.D.

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36" by 26' Wickes Q.C.G., M.D.

36" by 21' LeBlond G.R.D. Hd., M.D.

36" by 30' Putnam G.R.D. Hd., M.D.

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Large Gould & Eberhardt Rack Cutter For Sale
A Rare Tool

Length of bed 13', Length of Table 8'. Direct motor driven, Cap. 2½" Pitch—5½" OD. Has 7 Rack Backings 7' Long. 4 Index Plates, 23 Feed Gears 20-120T, 8 Index Gears 20-48T. 49 Table Index Gears 21-75T, 153 Assorted High Speed Cutters. Machine guaranteed in excellent condition

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Will you have Current Models of the following machines for sale after the war, or upon Contract Termination?

Press Brake (Light and heavy duty models)
Cleveland and Greenlee Automatic Screw Machines (all sizes)
Jones & Lamson #5 or larger Turret Lathe
Circle Shear and Flanging Machine
Sheet and Plate Shears, all sizes up to ⅜" x 10'
Power driven pinch type Bending Roll, 4' length or larger.

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Send for Our Latest Circular Covering Bargains in Small Tools Such as Drills, Reamers, Turret Attachments, etc.

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Modernized
CYLINDRICAL GRINDERS *for* SUPER-GRINDING *and* MICRO-FINISH

SIZES AVAILABLE

10x36	14x36	16x30
10x50	14x50	16x50
10x72	14x72	16x72
10x120	14x96	18x96
		18x168

Hill-Clarke Modernized and Motorized Cylindrical Grinders offer refinements in design which minimize vibration and assure extreme accuracy on all grinding operations. One of these refinements, the Hill-Clarke Patented Multiple V-Belt Drive to work spindle, contributes to the smoothness in operation which makes possible a finish within a few micro-inches even when using standard grain free-cutting wheels.

Send for a copy of our catalog "Super Grinding."

HILL-CLARKE MACHINERY CO. CHICAGO U.S.A.

Have you any NORTON grinders you wish modernized and motorized?

HILL-CLARKE MACHINERY CO.

651 WASHINGTON BOULEVARD **CHICAGO 6, ILL.**

MILLING MACHINES

- #2 Jackson Vertical Miller, M.D.
- #3H K & T Sliding Head Vertical Millers, M.D.
- 1—5' American triple purpose plain radial drill, motor on arm.
- #4 Cincinnati High Power Plain Miller, S.P.D.
- #4 Cincinnati Vertical Miller, H.P.S.D.
- 6' American Triple Purpose Plain Radial Drill, M.D.

GRINDERS

Lees Bradner Gear Grinder.
Simplicity Piston Grinder.
12" x 96" Landis Plain, S.C.

GEAR MACHINERY

- 18" Gleason Bevel Gear Generators.
- 6" Bilgram Bevel Gear Generator.
- #4—36" B & S Automatic Gear Cutter.

Lees Bradner Gear Grinder.

- #6 Fellows Gear Shaper, Cone.
- #2 Pfauter Gear Hobber.
- 36" Gould & Eberhardt Automatic Gear Hobbing Machine, Motor driven.

PLANERS

- 42" x 42" x 10' Cincinnati Hypro, 4 Heads, D.C. drill.
- 24" x 24" x 6' Gray Planer.
- 26" x 26" x 8' Woodard & Powell, 2 Hds.

MISCELLANEOUS

- 14" Niles Slotter
- #4 La Pointe Broach

CINCINNATI MACHINERY & SUPPLY CO.
217 East Second St., Cincinnati, Ohio

MILES' HIGH GRADE TOOLS

Automatic, 1¾" Gridley 4 spindle
Automatic No. 0 Brown & Sharpe
Automatic, 4½" Gridley "H" 4 spdl. chucking
Automatic, 7" Baird 6 spdl. chucking
Brake, 10' x 10 ga. Dreis & Krump leaf
Balancer, Micropoise flywheel
Balancer, 44" Norton
Broach, No. 3, J. N. Lapointe double
Broach, No. 2L Lapointe hydraulic
Drill, 20", 21", 24" Cincinnati Bickford
Drill, with tapping attmt. 25" Weigel
Drill, Nos. 2 & 3 Henry Wright sens.
Drill, Nos. 11 & 12 Natco multiple
Drill, 3½' American radial
Drill, 4' Western radial, Timken bearing
Drill, 24", No. 10 HO Baker hydraulic
Drill, 24", No. 314 Baker
Gear Hobber, No. 1 Lees Bradner
Gear Hobber, No. 16 HS Gould Eberhardt
Gear Lapper, 8" Red Ring
Gear Generator, 15" Gleason spiral bevel
Gear Tester & Lapper, 18" Gleason bevel
Gear Chamferers, Peerless & Lipe
Gear Cutters, 36" & 48" Brown & Sharpe
Grinder, 12" x 36", 16" x 36", 16" x 52" Landis
Grinder, 16" x 48" Landis crankpin
Grinder, No. 72 Heald sizing internal
Grinder, 20" Gardner semi-auto. disc.
Grinder, 6" x 22" No. 78, W. & M. Surface
Grinder, 8" x 24" LaSalle surface
Grinder, 12" x 24" Diamond surface
Grinder, 24" Cincinnati face milling cutter
Grinder, 6" x 20", No. 10 Brown & Sharpe
Grinder, No. 13 Brown & Sharpe T. & C.
Grinder, 6" x 18" Monarch surface
Hammer, No. 2B Nazel air, forging
Honing Machine, No. 211 Barnes
Lapper, No. 10U Norton
Lathe, Turret, No. 3B Foster
Lathe, Turret, 22" Libby
Lathe, Turret, 26" Libby, 4½" or 7½" hole
Lathe, Turret, 36" Bullard vertical, Rap. Pro.
Lathe, 14" x 6" Hendey
Mill, 42" Bullard vert., 1 plain, 1 turret head
Mill, 3" Universal horiz. boring
Miller, No. 2 Heavy Brown & Sharpe
Miller, No. 2 Van Norman duplex
Miller, No. 2 Brown & Sharpe vert.
Miller, No. 3 Reed Prentice vertical high speed
Miller, 30" Newton Continuous rotary
Miller, No. 1 Davis Thompson duplex
Miller, Type C Hall Planetary thread
Miller, Size 3 Turnmillers
Miller, Types 10 & 45 Productomatic
Miller, 48" Oesterlein tilted offset
Miller, No. 2 Kempsmith universal
Planer, 24" x 24" x 5' Gray
Planer, 36" x 36" x 16' Cleveland openside
Press, 34", No. 174 Consol. gap dbl. cr.
Press, 28", No. 71 Swaine double crank
Press, No. 53 Toledo straight side
Press, No. 6 Waterbury Farrel openback
Press, No. 33 Consolidated arch frame
Press, No. 2 Standard screw type
Riveter, Nos. 2A 5½B & 7B High Speed
Roll, No. R60 Yoder fender crowning
Roll, Forging, No. 1 Ajax Evans
Sprue Cutter, Model 1 Tessmer
Saws, 4", 7" & 8" Higley cold
Upsetter, 3" Acme steel body
Welder, 80 KVA Taylor Winfield butt
Welder, 7 KVA Winfield automatic spot

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FOSDICK 3½' Radial Drill, S.P.D.
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CIN.-BICK. 28" Drill Press, P.F., T.A.
J & L 3"x36" Turret Lathe, MD.
MILWAUKEE No. 2-B Double-Over-Arm Plain Miller, MD.
Available immediately. Also many other tools
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No. 0 Brown & Sharpe, m.d., latest type
4 spindle ⅛" Cleveland Model M, m.d.
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2½" Cleveland Model A, m.d.
2½" Cleveland Model A, m.d.
3⅛" Gridley Single Spindle, m.d.
4½" Cleveland Model A, m.d.
6" Cleveland Model A, m.d.
No. 6D Potter & Johnston Automatic for brake drum work
No. 22 New Britain, s.p.d., tapping spindle (3)
No. 23 New Britain, s.p.d., tapping spindle
No. 33 New Britain, m.d., tapping spindle

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1" Landis
⅜" Economy Auto. Threading, Lanco Head
No. 11-S Rickert-Shafer Auto. Threading, m.d., cap. ⅜" to 1" rods
2½" Acme Class A, belt

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2½" Cleveland, m.d.
3½" Bar, Rochester, m.d.
No. 21 Lucas, m.d., 3" bar
3¼" No. 1 Bloomquist & Eck, m.d.
3½" bar Betts, variable speed m.d.
4" bar Detrick & Harvey Floor Type, m.d.
4" Niles, m.d.
4½" Niles, m.d.
5½" Niles-Bement-Pond, m.d.
2½" bar Sargent, floor type, floor plate 16x4'
No. 0 Fosdick, 3" bar
No. 33 Lucas, m.d.

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42" Bullard New Era
24" Bullard New Era, m.d.
36" Bullard New Era, m.d.
42" Colburn, m.d., 2 rail heads
42" Niles Car Wheel Borer, belt, facing attach.
48" Cincinnati Rapid Production, 1 turret, 1 swivel head
48" Putnam Car Wheel Borer, belt, facing attach.
10' extended to 16' Betts, 2 rail heads, m.d.
12' Niles-Bement-Pond, m.d., 2 rail heads, p.r.t.
60" Niles, 2 heads, m.d., p.r.t.

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Cincinnati Mill Broach, 10" spindle, m.d., new
No. 2 LaPointe of Hudson, belt
No. 2 J. N. LaPointe, belt
No. 3 J. N. LaPointe Double, belt
No. 4 LaPointe of Hudson, m.d.

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3' American Sensitive
3' Fosdick Sensitive, s.p.d.
3½' Cincinnati-Bickford, m.d.
4' Cincinnati-Bickford Plain, gear box
4' Cincinnati-Bickford Plain, m.d. on arm
4' Cincinnati-Bickford Plain, U.S. Vari-drive on base
4' Niles-Bement-Pond Semi-Universal, m.d.
4' Reed-Prentice Plain, gear box
5' American Triple Geared, gear box
5'-17" column Cincinnati-Bickford, m.d. on arm
5' Cincinnati-Bickford Plate Hole Driller, d.e. motor on arm
5' Prentice Plain, m.d.
5' Niles-Bement-Pond Full Universal, gear box
6' Cincinnati-Bickford Full Universal, m.d.
6' Reed-Prentice, gear box
6' Niles-Bement-Pond Semi-Universal,, m.d.
6' Western Plain, gear box
7' American Triple Purpose, m.d. on arm, 16" column
8' American Triple Purpose, m.d. on arm

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No. ½ Avey, m.d.
Mason Bench Type, belt
Providence Model K, gear box
Providence Model E, gear box
Sipp Quick Change No. 2
Taylor & Fenn No. 2
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Henry & Wright Class K
2 spindle Sigourney, belt
3 spindle Barr, No. 1
4 spindle No. 2 Fosdick, p.f.
4 spindle Gardam, No. 1
4 spindle Kokomo, No. 3
6 spindle No. 3 Avey
6 spindle No. 2B Edlund, m.d. on each spindle, latest type, power feed

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Pratt & Whitney Rifling Machine
5 spindle Detroit
6 spindle National Acme
8 spindle Hammond, hydraulic

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LUCAS #1 Horiz. Boring Mill—3" bar, M.D.
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LANDIS 20"x220" Plain Cyl. Grinder—M.D.
G. & E. 18" Univ. Gear Hobber
GLEASON 3", 6" & 11" Bevel Gear Generators—2 tool type
GLEASON 10" Spiral Bevel Gear Generator
GLEASON 15" Spiral Bevel Gear Generator
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INGERSOLL 24" Cutter Grinder
INGERSOLL 26"x26"x12' Planer Type Miller
SAUNDERS 8-18" Pipe Threader
TREADWELL 12" Pipe Machine

LATEST TYPE MACHINE TOOLS — Built in 1942

DEFIANCE #25-A Horiz. Boring Mill—3¼" bar
GLEASON 12" Straight Bevel Gear Generator
GLEASON 3" Straight Bevel Gear Generators
PRATT & WHITNEY 4½"x12" Thread Miller—Model C

ALL MOTOR DRIVEN AND INCLUDING 3 phase, 60 cycle, 220 volt, A. C. motors

GRAY 36"x36"x10' Planer—2 heads
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GRAY 60"x48"x14" Planer—3 heads
N.B.P. 48"x36"x14' Planer—3 heads—box table
L. T. SCHAEFER 100 ton Horiz. Hyd. Forcing Press
LYND FARQUHAR 26" Openside Crank Planer & Shaper
GISHOLT Precision Balancer
BAUSH Gun Barrel Rifling Machine
ESPEN LUCAS #138 Cold Cutting Saw—Cap. of blade 12"
SLEEPER & HARTLEY Coil Winder
CINCINNATI Gear Burnisher

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BORING MILLS

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66", 120" Niles
42" Bullard, turret head, swivel head
54", 62" Colburn, M.D.

HORIZONTAL

2½" Universal, Binsee
4" Dietrich & Harvey Floor, M.D.
4", Binsee, 4½" Bement-Niles

TURRET LATHES

No. 2A, 3A W. & S., 4½" hole
26" Libby 7½" hole, 18" Libby, 3½" hole
24" Gisholt, 6½" hole
Foster Nos. 4, 5, 6, 1B, M.D.
W. & S. Nos. 2, 4 Universal, M.D.
J. & L. 2¼x24", 3¼x36"
Acme 3¼x86" grd head

GRINDERS

#50 Heald Int., Hydraulic, M.D.
P. & W. 14", 18", B.B. Vert. M.D.
Blanchard 26", 30", M.D.
Modern 12x48", M.D.
Norton Hydraulic 12x18", M.D.
Heald Nos. 55, 70, 72A Internal, M.D.
Norton 50" x 28', M.D.
Gardner 72" Disc, M.D.
Landis 6x20" Hydraulic, M.D.
Bryant No. 12, M.D.

LATHES

14"x6' Sebastian Grd Head
48"x12' Harrington Gap, Sld Bed.
McCable 26-42"x14'
26"x24' Putnam 3 step cone, D.B.G.
20"x12' Boye & Emmes, 3 step cone, D.B.G.
20"x14' Rahn-Larmon, raised to 24"
16"x8' Lodge & Shipley Grd Hd, taper M.D.
14"x6' Hendey, tie bar, taper
14"x6' Mulliner, taper, collets
9" LeBlond Automatic

AUTOMATICS

New Britain 1⅝"x7" 6 spindle, Timken bearings.
Cleveland Model A, ½", ⅝", 1¼", 2"
Cleveland Model B, 1", 2"
Gridley 1¾", 2¼", 4 spindle
Cleveland ⅞", Model M, 4 spindle
Gridley 4¼", single spindle, M.D.
B. & S. Nos. 00, 0G, 2, 2G
P. & J. No. 6A, M.D.
National-Acme Model C, 1⅝", 5 spindle, M.D.
No. 1 Petermann

GEAR CUTTERS

No. 3, 12 Barber-Colman Gear Hobber
No. 6 Fellows Gear Shapers
B. & S. Nos. 3-26", 4-36"
Gleason 11" Bevel

MILLING MACHINES

No. ½ Van Norman
10" P. & W. Automatic
No. 2A Milwaukee, S.P.D.
No. 3S Cincinnati, S.P.D. rapid traverse, M.D.
Nos. OY, 1Y, 3, 4, 5, B. & S. Plain & Univ.
B. & S. No. 12, 13, 13B
Hall Planetary Model D Thread Miller
Providence Planer Type 32"x8'
Becker Nos. 3, AB, 5, 6 Vert.
Nos. 3, 4 Cincinnati Vert.
P. & W. No. 12 Profiler, M.D.
No. 2—Kent-Owens

RADIALS

4' American Triple Purpose
8' American Triple Purpose, M.D.
5' Dreses, Full Universal
3', 3½' Cincinnati-Bickford
4' Mueller, M.D.
4', 5' Western, S.P.D.

MISCELLANEOUS

6 spindle Avery Drill, 15" overhang
800 ton coining press, McCabe ½" Flanger
Rochester No. 5B High Speed Hammer
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P. & W. 6" Vert. Shaper
Marvel Metal Band Saw, M.D.
Pipe Machines, 2", 4", 6", 8", M.D.
N.B.P. 15" Slotter, M.D.
No. 30 Natco Multiple Spindle Drill
150 ton United Steam Hammer
Thompson-Gibbs Spot Welders 17 KVA
Anderson Tapper, No. 23A, Quickwork
Rotary Shear
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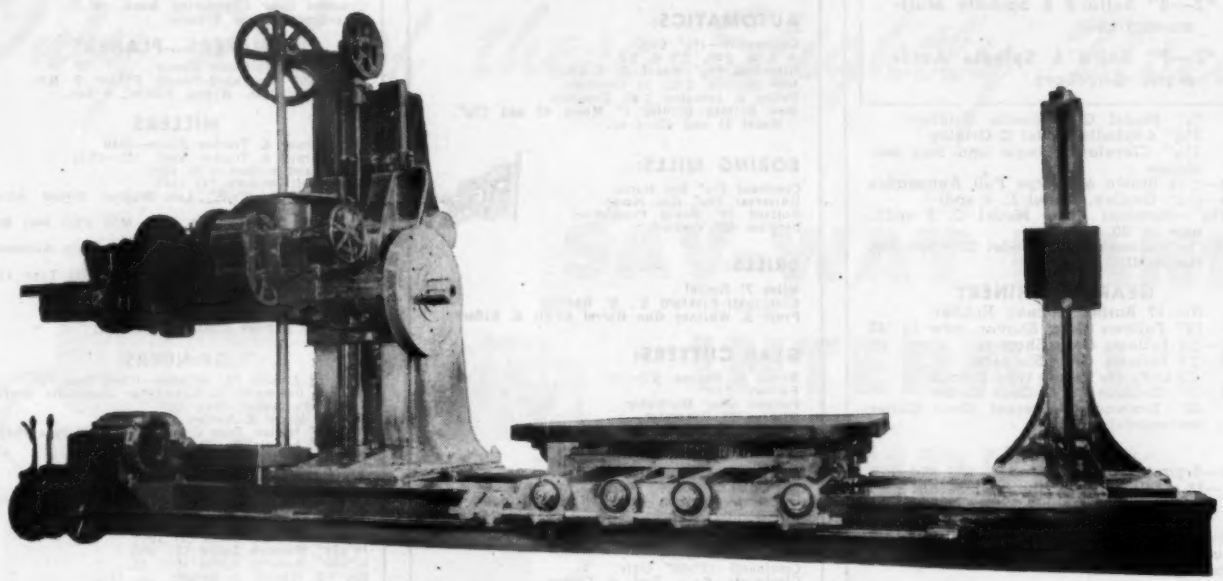

8" BEMENT MILES HORIZONTAL BORING MACHINE

Diameter of spindle 8" — 36" gear driven face plate — Spindle traverse 54" — Max. spindle to outer support 15'6" — Table 96" x 96". Minimum center of spindle to table 6" — Maximum center of spindle to table 72" — Adjustment of head on column 66" — Table cross travel 72", power — Table rotates 360°, power — Table longitudinal travel 10', power — Outer support bearing power raise and lower with head — Threading attachment.

12½ H.P. 600/1200, 230 volt D.C. motor and controls.

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1—36" widened to 48"x36"x16' Gray Dbl. Housing Spur Grd. Planer, with 3 hds., A.C. m.d.
1—54"x54"x18' Cinci. Dbl. Housing Planer with 3 hds., A.C. m.d.
1—3" bar Morris Horiz. Boring Mill with 5 boring bars, m.d.
1—6' Niles Pl. Radial Drill, rebuilt, gear box, A.C. m.d.
1—12"x18" Cinci. Rebuilt Plunge Cut Grinder, 18"x9" face wheel, A.C. m.d.

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Grinder, Sellers Tool
Grinder, 60" knife
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*1⅝"—National Acme Model C, 5 spdl., new in '30
*1¼"—National Acme Model G, 4-Spindle, thr. spdl.

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* 12" Fellows Gear Shaver, new in '43
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*4—#7 Fellows Gear Shapers
* #3 LaPointe Screw type Broach
2—11" Gleason Bevel Gear Cutter
36" Brainard Universal Gear Cutter (automatic)

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*2—Bryant Chucking Grinder, #12 and #20
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* 10 x 24 Norton O. D., nine years old
*2—Sav Way Internal Grinders with excello spindles, motor, hand feed, rebuilt and guaranteed

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Osterlein Rotary Mill 48"
* #3 Brown & Sharpe Horizontal
* #3 Cincinnati Universal
* #2 Brown & Sharpe Vertical
* #2 Brown & Sharpe Universal
* #3 Heavi-duty LeBlond Universal
*12—#4 Burke Horizontal, special set up for making end mills.

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Metal cutting vertical band saw, large 8' hand leaf brake

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Oram, 2" stroke double end punch and shear

MISCELLANEOUS

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Several loose change gear lathes
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Hanna Riveter, 104" throat depth, excellent condition
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Becker #4B Vertical
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Rowbottom Cam Miller
P & W 5" Automatic
Pratt & Whitney 2" Spline Duplex
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Cincinnati 12" B.G. Mfg. Becker #7H Lincoln

MISCELLANEOUS:

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Hammer—Bendry #6—150 Lb. Power
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No. 1—12" and 1—18" Cincinnati Plain Automatic millers latest type (10) 1941
No. 2 Cincinnati Vertical Miller, Dial Type (11) 1941
No. 3 Cinc. Dial Type Hor. (2) 1941
New No. 3 Wigglesworth
4" Taylor & Fenn Duplex Spline 1941

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10"x72" Model C Norton 1941
10"x120" Norton Type C Grinder—latest type 1941
12"x120" Landis Pl. M.D.
No. 10 B & S Plain Grinder, M.D.
No. 3 Osterlein C & T Grinder

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22"x72" Ledge & Shipley 1941
24"x72" LeBlond Lathe (3) 1941
16"x78" Monarch Lathe (2) 1941
12"x30" Monarch Lathe 1940 (2)
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6"x8¾" Goss & DeLeeuw Chucking Machine
No. 5 Jones & Lamson 1940
No. 6R Cincinnati Acme 1941
24" Bullard Vert. Turret, Hi-Speed 1940

MISCELLANEOUS

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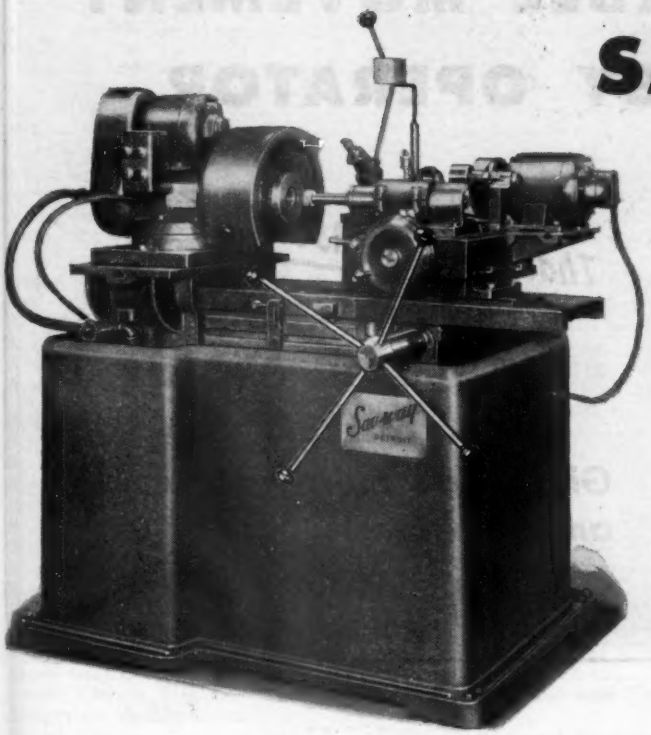

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Six stations are used for the various profile milling operations on this part. The table rotates continuously and the operator simply unloads and reloads each station in turn while the cutter is milling the part in another station.

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ADVERTISERS INDEX

	Page
Abrasive Machine Tool Co.	212
Accurate Bushing Co.	272
Ace Manufacturing Corp.	152
Adams Company	182, 186
Air Reduction	254
Allegheny Ludlum Steel Corp.	270
Allis-Chalmers Mfg. Co.	32, 58, 85
Almond Mfg. Co., T. R.	252
Aluminum Co. of America	49
American Chain & Cable Co., Inc.	277
American Laundry Machinery Co.	278
American Screw Co.	159
American Tool Works Co.	20, 21
American Welding & Mfg. Co.	279
Ames Co., B. C.	252
Ampco Metal, Inc.	166
Automatic Machine & Tool Co.	256
Armstrong-Blum Mfg. Co.	54
Armstrong Bros. Tool Co.	50
Atlantic Screw Works	159
Avey Drilling Machine Co.	214
Barber-Colman Co.	65
Barnes Co. Inc., W. O.	242
Baumbach Mfg. Co., E. A.	190
Bay State Abrasive Products Co.	255
Bearings Co. of America	180
Beatty Machine & Mfg. Co.	190
Black Drill Co.	250
Blake Co., Edward	220
Blanchard Machine Co.	28
Blank & Buxton Machinery Co.	166
Bodine Corp.	198
Boston Gear Works	185
Braun Gear Co.	182
Breuer Electric Mfg Co.	260
Bridgeport Machines, Inc.	224
Bristol Co.	159
Brown & Sharpe Mfg. Co.	73, 274
Bryant Chucking Grinding Co.	17
Bullard Co.	45
Butterfield & Co. (Division of Union Twist Drill Co.)	35
Capewell Mfg. Co.	152
Carboloy Co.	246, 247
Card Mfg. Co., S. W. (Division of Union Twist Drill Co.)	34
Carlton Machine Tool Co.	216
Carpenter Steel Co.	76, 77
Central Screw Co.	159
Chandler Products Co.	159
Chisholm Moore Hoist Corp.	164
Cincinnati Bickford Tool Co.	87
Cincinnati Electrical Tool Co.	278
Cincinnati Gear Co.	184
Cincinnati Gilbert Machine Tool Co.	214
Cincinnati Grinders, Incorporated	10, 11
Cincinnati Lathe & Tool Co.	216
Cincinnati Milling Machine Co.	4, 5
Cincinnati Planer Co.	70
Cincinnati Shaper Co.	90
Circular Tool Co.	260
Clark Co., Robert H.	269
Clearing Machine Corp.	189
Cleveland Automatic Machine Co.	201
Cleveland Hobbing Machine Co.	48
Cleveland Punch & Shear Works Co.	78
Climax Molybdenum Co.	137
Columbus McKinnon Chain Corp.	164
Colonial Broach Co.	141
Cone Automatic Machine Co.	31
Continental Screw Co.	159
Corbin Screw Corp.	159
Coulter Machine Co., James	222
Covel Mfg. Co.	219
Crafts Co., Inc., Arthur A.	260
Criterion Machine Works	264
Cross Co.	26, 27
Cullen-Friestedt Co.	266
Cushman Chuck Co.	236
Dakon Tool & Machine Co.	240
Danly Machine Specialties, Inc.	192
Dalzen Tool & Mfg. Co.	211
Davis Keyseater Co.	214
Davis & Thompson Co.	224, 256
Dayton Rogers Mfg. Co.	190
Deep Freeze Div., Motor Products Corp.	200
Defiance Machine Works, Inc.	205
DeLaval Separator Co.	174
De Sanno & Son Inc., A. P.	243, 244
Desmond-Stephan Mfg. Co.	264
Detroit Broach Co.	249
Detroit Die Set Corp.	188
DeVlieg Machine Co.	74
Disston & Sons Co., Inc., Henry	235
Eastern Machine Screw Corp.	274
Eddy Mfg. Co.	240
Errington Mechanical Laboratory	240
Etna Machine Co.	191
Executone, Inc.	192
Excello Corp.	46, 47
Federal Press Co.	194
Federal Products Corp.	227
Fellows Gear Shaper Co.	8, 9
Fenn Mfg. Co.	56
Firth Sterling Steel Co.	40, 41
Fitchburg Grinding Machine Corp.	83
Follansbee Steel Corp.	157
Foote-Burt Co.	72
Fosdick Machine Tool Co.	64
Gallmeyer & Livingston Co.	196
Ganschow Gear Co.	186
Gates Rubber Co.	179
Gear Grinding Machine Co.	215
Gear Specialties Mfrs.	182
General Electric Co.	37, 42, 67
General Screw Mfg. Co.	159
Geometric Tool Co.	232
Gilmore & Co., F. F.	268
Gisholt Machine Co.	30, 84
Gits Bros. Mfg. Co.	80
Gleason Works	3
Goss & deLeeuw Machine Co.	216
Grant Gear Works	182
Grant Mfg. & Machine Co.	190
Gray Co., G. A.	66
Greenfield Tap & Die Corp.	273
Greenlee Bros.	209
Gulf Oil Corp.	261
H. & H. Machine Tool Co.	240
Hamilton Tool Co.	220
Hanson Whitney Machine Co.	162
Hardinge Brothers, Inc.	39
Harper Co., H. M.	159
Hartford Special Machinery Co.	186, 256
Haskins Co., R. G.	222
Haynes Stellite Co.	223
Heald Machine Co.	2nd Cover
Hedstrom Corp., Oscar W.	160
Hendey Machine Co.	217
Hobart Brothers Co.	262
Hoefer Mfg. Co.	276
Holman Reamer Co.	186
Holtzer-Cabot Div. First Industrial Corp.	175
Hones, Inc., Charles A.	278
Illinois Tool Works	267
Independent Pneumatic Tool Co.	248
International Nickel Co.	161
International Screw Co.	159
J & S Tool Co.	276
Johansson Gage Div., Ford Motor Co.	192
Johnson Bronze Co.	176
Johnson Machine Co., Carlyle	178
Johnson Tool Co.	260
Jones & Lamson Machine Co.	6, 7
Jones & Laughlin Steel Corp.	147
Kearney & Trecker Corp.	57
Kennametal, Inc.	52
King Machine Tool Co.	60
Kingsbury Machine Tool Corp.	29
Kirk & Blum Manufacturing Co.	281
Knight Machinery Co., W. B.	218
Kobe, Incorporated	259
L-W Chuck Co.	202
Lake Shore Tool Works, Inc.	233
Lamson & Sessions Co.	159
Landis Machine Co.	14, 15
Landis Tool Co.	18, 19
Latrobe Electric Steel Co.	253
LeBlond Machine Tool Co., R. K.	3rd Cover
Leach Machinery Co., H.	218
Leland Gifford Co.	224
Le Maire Tool & Mfg. Co.	184, 206
Lincoln Park Industries, Inc.	139
Lindberg Engineering Co.	282
Littel Machine Co., F. J.	274
Linley Bros. Co.	226
Lodge & Shipley Machine Tool Co.	135
Lord Manufacturing Co.	173
Lovejoy Tool Co., Inc.	245
Lucas Machine Tool Co.	226
Luers, J. Milton	226
Lufkin Rule Co.	151
Macklin Co.	251
Manheim Manufacturing & Belting Co.	169
Manufacturers Screw Products	159
Master Electric Co.	178
Master Rule Mfg. Co.	250
Mathews Conveyor Co.	262
McGraw-Hill Book Co., Inc.	178, 193
McKay Co.	275
Mead Specialties Co.	264
Meisel Press Mfg. Co.	186
Metro Tool & Gage Co.	53
Michigan Tool Co.	145
Mid-West Abrasive Co.	38
Milford Rivet & Machine Co.	159
Miller-Knuth Mfg. Co.	226
Millholland Machinery Co., W. K.	226
Mitts & Merrill	218
Modern Tool Works	238
Molybdenum Corp.	170
Monarch Machine Tool Co.	24, 25
Moore Special Tool Co.	155
Morey Machinery Co., Inc.	218
Murchey Machine & Tool Co.	271
National Machine Tool Co.	268
National Screw & Mfg. Co.	159
Newark Gear Cutting Machine Co.	182
New England Screw Co.	159
New-Britain-Gridley Machine Div. New Britain Machine Co.	132
New Departure Div., General Motors Corp.	149
Niagara Machine & Tool Works	195
Nicholson & Co., W. H.	252
Nicholson File Co.	156
Noble & Westbrook Mfg. Co.	272
Norma-Hoffman Bearings Corp.	172
Norton Co.	22, 23
Oakite Products, Inc.	272
Ohio Machine Tool Co.	82
Ohio Oil Co.	43
Oliver Instrument Co.	213
O'Neil Irwin Mfg. Co.	192

ADVERTISERS INDEX

	Page
Orange Roller Bearing Co., Inc.	167
Osborn Manufacturing Co.	225
Page Steel & Wire Div., American Chain & Cable Co., Inc.	277
Park Chemical Co.	237
Parker-Kalon Corp.	159
Pawtucket Screw Co.	159
Peerless Machine Co.	203
Perkins Machine & Gear Works, Inc.	183
Pheoll Mfg. Co.	159
Philadelphia Gear Works, Inc.	181
Phillips Screw Manufacturers	159
Plan-O-Mill Corp.	199
Portage Machine Co.	220
Porter-McLeod Machine Tool Co., Inc.	214
Potter & Johnston Machine Co.	79
Pratt & Whitney Div., Niles-Bement-Pond Co.	63
Production Machine Co.	222
Progressive Welder Co.	143
Quaker Chemical Products Corp.	55
Queen City Machine & Tool Co.	280
Railway Express Agency—Air Express Div.	188
Randall & Stickney	252
Reading Screw Co.	159
Ready Tool Co.	276
Reed-Prentice Corp.	16
Reeves Pulley Co.	163
Rivett Lathe & Grinder, Inc.	204
Roberts Rubber Co., Weldon	231
Rockford Machine Tool Co.	210
Russell, Burdsall & Ward Bolt & Nut Co.	159
Ruthman Machinery Co.	164
Safety Grinding Wheel & Machine Co.	230
Schatz Manufacturing Co.	165
Schauer Machine Co.	226
Scherr Co., Inc., George	86
Scovill Mfg. Co.	159
Shakeproof, Inc.	159
Shore Instrument & Mfg. Co., Inc.	256
Sidney Machine Tool Co.	61
Sier-Bath Gear Co., Inc.	187
Siewek Engineering Div. Domestic Industries, Inc.	265
Sigourney Tool Co.	214
Simonds Worden White Co.	274
Smit & Sons, J. K.	160
Smith & Mills Co.	224
Snyder Tool & Engineering Co.	208
South Bend Lathe Works	62
Southington Hardware Mfg. Co.	159
Springfield Machine Tool Co.	36
Starrett Co., L. S.	130
Sterling Grinding Wheel Division	44, 68
Stuart Oil Co., Ltd., D. A.	272
Sundstrand Machine Tool Co.	207
Sunnen Products Co.	221
Sun Oil Co.	234
Taft Peirce Mfg. Co.	158
Tannewitz Works	224
Taylor Machine Co.	182
Thompson Grinder Co.	81
Thompson Mfg. Co., Earl A.	294
Timken Roller Bearing Co.	4th Cover
Torit Mfg. Co.	280
Torrington Co.	192
Trabon Engineering Corp.	171
Udylite Co.	228
Union Carbide & Carbon Corp.	223
Union Twist Drill Co.	33
United States Products Co.	262
United Welding Co.	258
Universal Boring Machine Co.	218
Universal Engineering Co. (Mich.)	226
Universal Wheel & Abrasive Corp.	263
V. & O. Press Co.	190
Van Keuren Co.	51
Van Norman Company	12, 13
Vard, Inc.	239
Vascaloy Ramet Corp.	257
Victor Machy. Exchange, Inc.	258
Vulcan Tool Corp.	71
Walker Co., Inc., O. S.	266
Walker Turner Co.	197
Waltham Machine Works	184
Waltham Screw Co.	268
Warner & Swasey Co.	88
Waterbury Steel Ball Co.	164
Wendt-Sonis Co.	150
Wesche Electric Co., B. A.	168
Westinghouse Air Brake Co.	69
Westinghouse Electric & Mfg. Co.	59, 75
Wetmore Reamer Co.	229
Williams Co., J. H.	241
Wilson Mechanical Inst. Co., Inc.	264
Wolverine Bolt Co.	159
Worthington Pump & Machinery Corp.	177

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THURSDAY, OCTOBER 5, 1944 — 10:30 A. M. (CWT)

PARTIALLY COMPRISING

(9) #4 and #5 MIDLAND GEARED HEAD UNIVERSAL TURRET LATHES — some with air chucks and bar feed — PRACTICALLY NEW.

#3A W. & S. UNIVERSAL TURRET AND 18" LIBBY INTERNATIONAL GEARED HEAD LATHES.

(6) GEARED HEAD AND STANDARD ENGINE LATHES, sizes 10"x3½' to 16"x8'.

(2) 1½" LANDMACO THREADING MACHINES — PRACTICALLY NEW.

(2) 12"x15" FAY AUTOMATIC LATHES.
#1½ HENDEY NORTON, #3 BROWN & SHARPE, #0 ROCKFORD & BURKE UNIVERSAL, PLAIN AND VERTICAL MILLERS

18"x24" CINCINNATI & GOOLEY & EDLUND PRODUCTION MILLS; FOOTE BURT, BAKER & SUPERIOR RAIL TYPE GANG AND HEAVY DUTY UPRIGHT DRILLS.

6' AMERICAN RADIAL DRILL — EDLUND, DURO AND ATLAS FLOOR AND BENCH SENSITIVE DRILLS, 1 and 2 spdle.

28" SMITH & MILLS SHAPER.

LANDIS 10"x72" AND 8"x15" STORM CYLINDRICAL, #2 B & S SURFACE, #52 GREENFIELD INTERNAL, ZEPHYR CENTERLESS, BENCH AND PEDESTAL GRINDERS.

BRUNNER GARAGE TYPE AIR COMPRESSOR.

BOICE CRANE BAND SAW: 6x6 TOLEDO HACK SAW.

ALSO

VISES, TOOLMAKER'S BENCHES, STOOLS, TOTE PANS, LIFT TRUCKS, FANS, FLUORESCENT LIGHTS, DRILLS, TAPS, MILLING CUTTERS, REAMERS, CUTTING TOOLS, ARBOR PRESSES, ETCHING MACHINES, ELECTRIC DRILLS AND MOTORS . . . and hundreds of items too numerous to mention.

INSPECTION OCTOBER 2nd TO SALE DATE

SEND FOR FREE ILLUSTRATED CIRCULAR—WRITE—WIRE—PHONE

Sale Under Management of **Industrial Plants Corporation** *Auctioneers, Liquidators, Appraisers*

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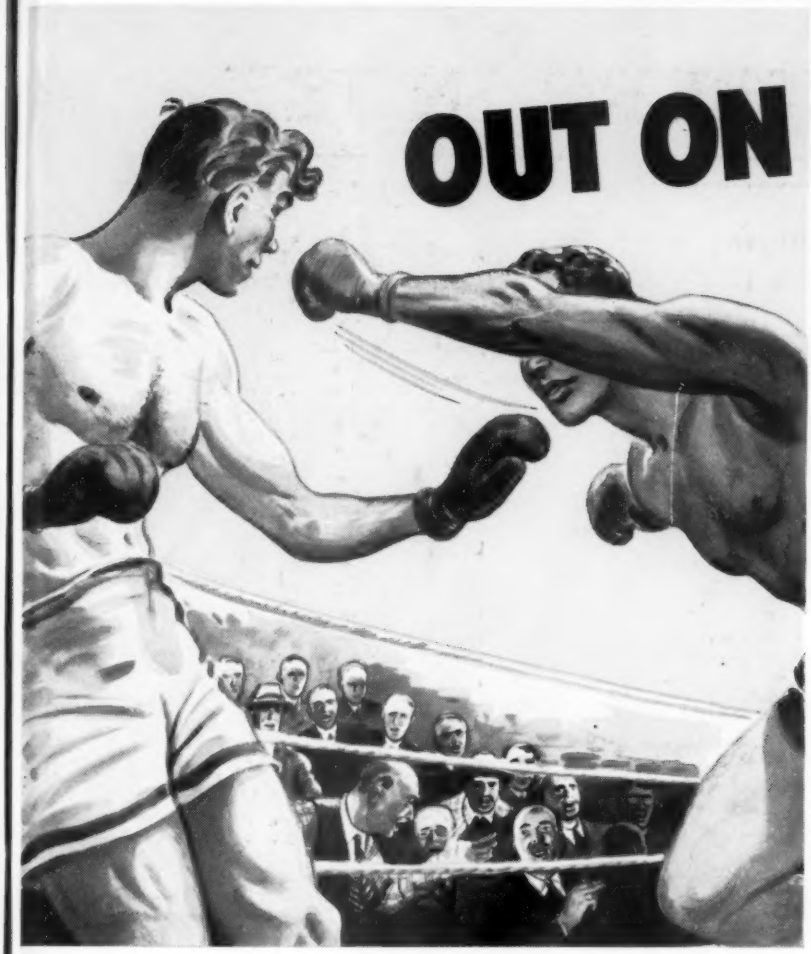
Page
280
192
171
228
223
33
262
258
218
226
263
190
51
2, 13
239
257
258
71
266
197
184
268
88
164
150
168
69
59, 75
229
241
264
159
177



OUT ON HIS FEET

And so is that old lathe in your plant. Of course it can still run, still produce, — BUT HOW?

Its percentage of scrap runs pretty high; time has to be taken out for frequent readjustments; the operations it can do are limited; it is hard to operate; its undependable performance plays the devil with fine tolerances and drives the blameless operator almost to distraction. It's a mechanical "slow down striker" on your production line. You're money ahead to toss in the towel and get a brand new lathe.

Get a lathe that turns at a profit as it trues your product . . . a lathe that when it's set, IS SET and turns out the work better and faster. Get one that is easy to operate . . . one whose range and variety of operations make it a machine tool of outstanding versatility. Get a New LeBlond Lathe.

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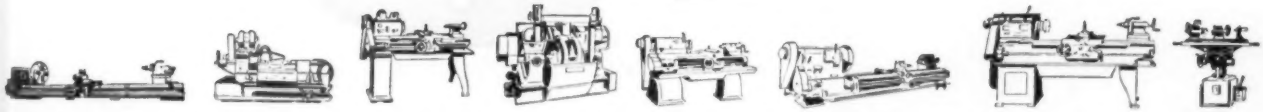
- ☐ AUTOMATIC LATHES
- ☐ AUTOMATIC CRANKSHAFT LATHES
- ☐ SUPER REGAL GEARED HEAD LATHES
- ☐ No. 2 CUTTER GRINDER

TITLE_____

YOUR NAME_____ ADDRESS_____

YOUR FIRM_____



HD Engine Lathes—Nine sizes ranging from 12" to 50" swings. For versatility in turning.

Automatic Lathes—12" & 16". Mechanical or Hydraulic power.

Super Regal Lathes—Six sizes, 13" to 24". Best for training.

Automatic Crankshaft Lathes—For all facing, turning, finishing, pins.

Tool Room Lathes—12", 14", 16" and 18" swings. Versatile.

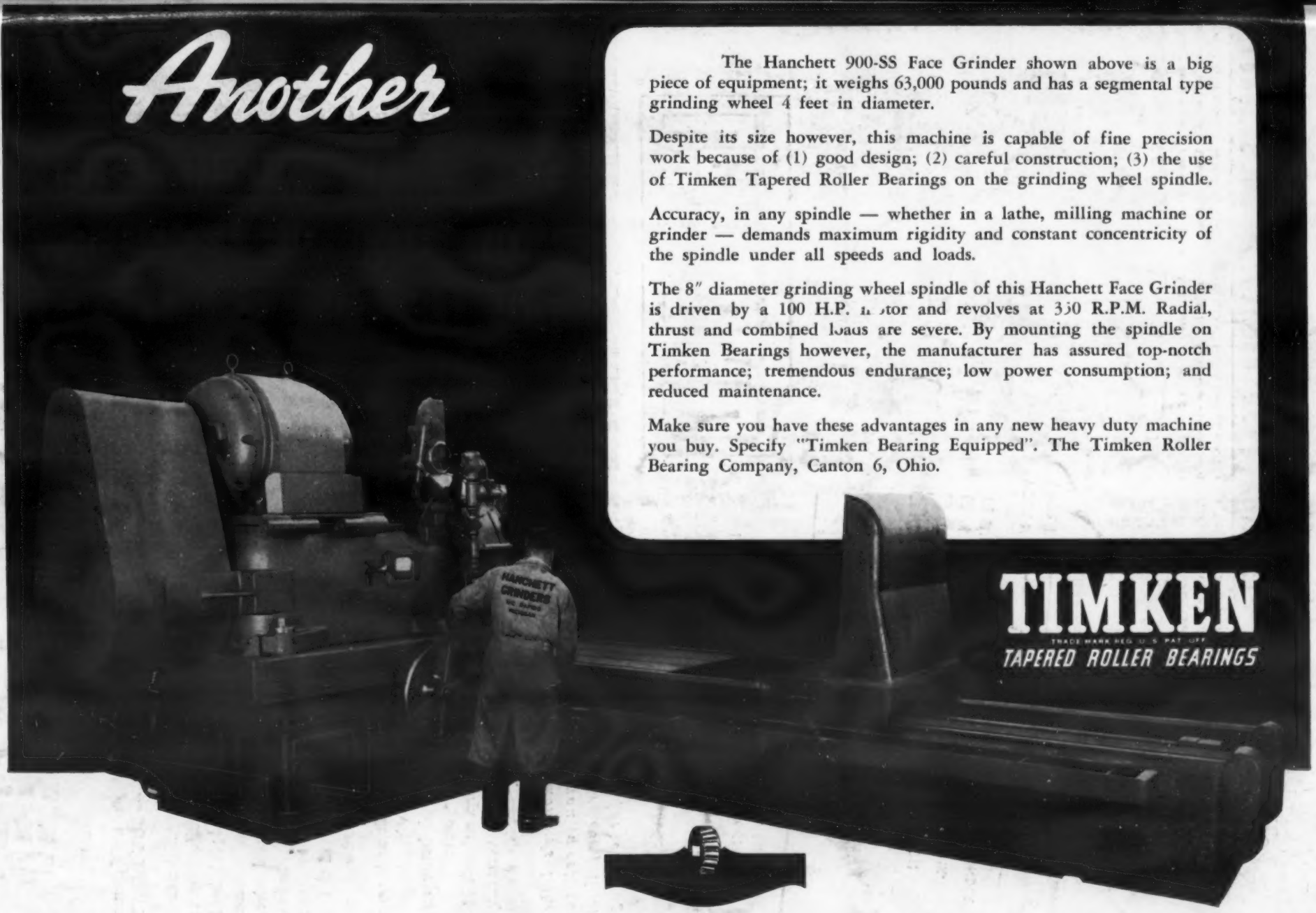
HD Gap Lathes—Ten sizes in Regular and Sliding Gap models.

Rapid Production Lathes—13", 17", 20" swings. Six speeds. Faster output. Lower cost.

No. 2 Cutter Grinder—Internal, cylindrical, face and angular work.

LARGEST MANUFACTURER OF A COMPLETE LINE OF LATHES

Another



The Hanchett 900-SS Face Grinder shown above is a big piece of equipment; it weighs 63,000 pounds and has a segmental type grinding wheel 4 feet in diameter.

Despite its size however, this machine is capable of fine precision work because of (1) good design; (2) careful construction; (3) the use of Timken Tapered Roller Bearings on the grinding wheel spindle.

Accuracy, in any spindle — whether in a lathe, milling machine or grinder — demands maximum rigidity and constant concentricity of the spindle under all speeds and loads.

The 8″ diameter grinding wheel spindle of this Hanchett Face Grinder is driven by a 100 H.P. motor and revolves at 350 R.P.M. Radial, thrust and combined loads are severe. By mounting the spindle on Timken Bearings however, the manufacturer has assured top-notch performance; tremendous endurance; low power consumption; and reduced maintenance.

Make sure you have these advantages in any new heavy duty machine you buy. Specify "Timken Bearing Equipped". The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

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TAPERED ROLLER BEARINGS